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L. M. Haupt

Durham

1889

Durham System of House Drainage

NEW-YORK LIFE INS. CO'S BUILDING, ST. PAUL, MINN.

Furnished with the
Durham System of House Drainage.

Messrs. Babb, Cook & Willard,
Architects.

The Durham Patent System

OF

Screw-Joint Iron House Drainage

MANUFACTURED SOLELY BY THE

Durham House Drainage Co.

OF NEW YORK.

(Under the control and management of Members of the
American Society of Civil Engineers.)

158–160 West 27th St. New York City.

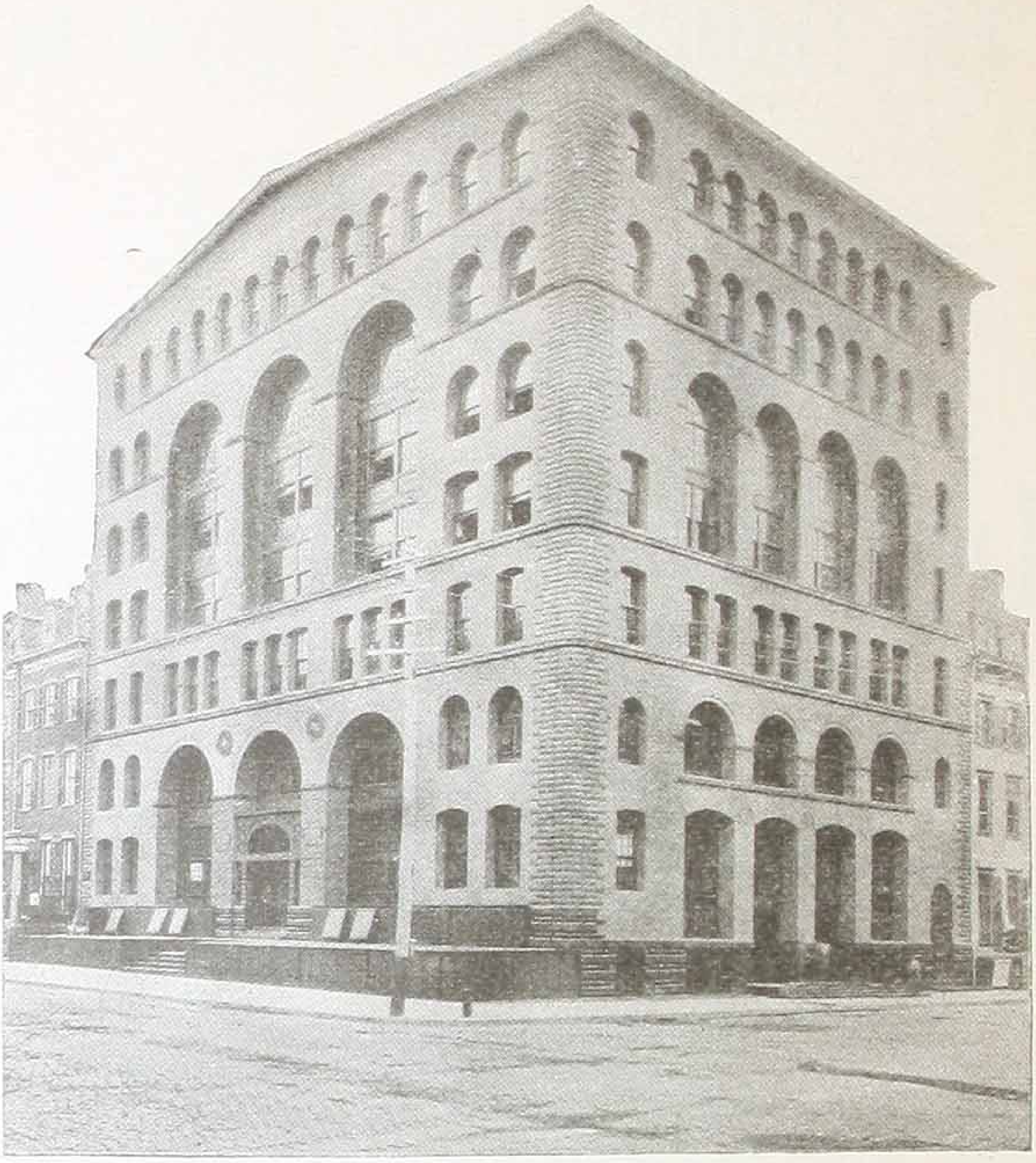
SOLE AGENTS FOR

Colorado, California, Nevada, Wyoming, Utah, Arizona
and New Mexico, the

Western Durham Drainage Co.

Principal Office, 28 Barclay Building, Denver, Colorado.
Branch Office, 220 Sutter Street, Room 8, San Francisco, Cal.

THE DE VINNE PRESS.
1889.



THE DE VINNE PRESS.

Furnished with the Durham System of House Drainage.

Sanitary Engineering.

During the ten years which have passed since the first building was fitted with the Durham System of drainage, there has been a great advance in popular knowledge and appreciation of sanitary science.

For several years the Durham House Drainage Company carried on business at a heavy annual loss because the public had not learned the wisdom of making a sufficient expenditure to secure good plumbing.

It was the rule to accept the lowest bid for the plumbing work of a building without much regard to the character of the bidder.

Happily these conditions are rapidly changing. The growth of the business of this Company, its operations now extending to all parts of the United States and Canada, is an evidence that the use of the best drainage work that can be obtained is now recognized as true economy.

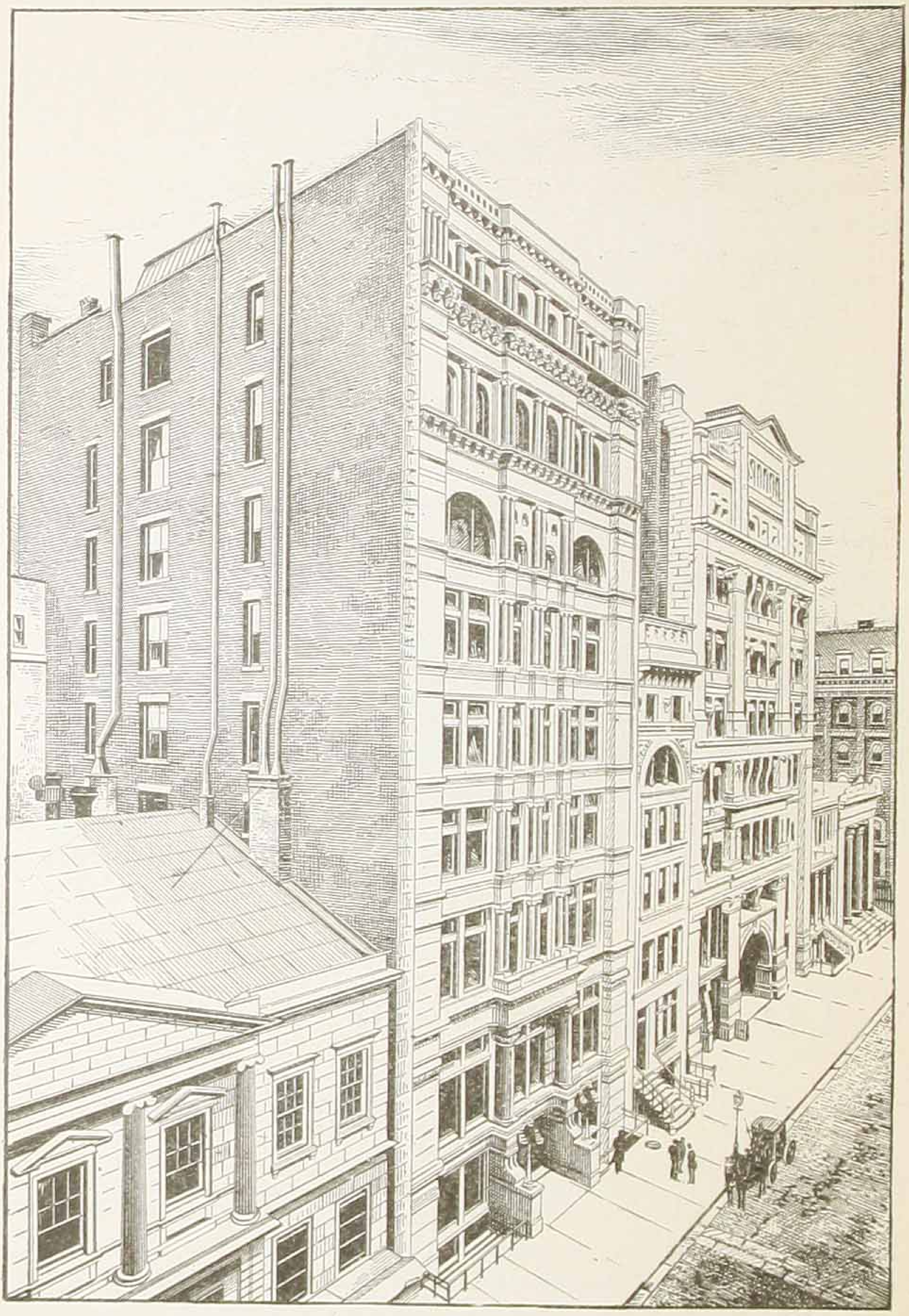
Drainage work of the high scientific and mechanical character of the Durham System requires conscientious agents for its introduction. As far as is practicable we prefer to retain in our own hands the work of construction in order to secure the proper execution of our plans. This policy, which is for the best interests of the house-owner, brings against us the opposition of the Trade on account of its interference with their profits.

If the work is not of sufficient importance, or the distance too great to warrant payment of traveling expenses of an expert from New York, we take great pains to furnish complete instructions, which will enable the purchaser to see that the work we ship him is erected properly.

We make no charge for expert advice, plans, specifications, or correspondence. We have a fixed price for each fitting, for pipe per foot, and for cutting threads on pipes: these three items control the cost of each system. The price will be the same, therefore, whether fixed before or after the work is completed.

To Builders of Large Structures.

We make a specialty of furnishing plans and specifications, and constructing the drainage system of large buildings on our patented system anywhere in North America. For this class of work we have unrivaled facilities. Our ten years of experience has secured us a corps of expert engineers and mechanics, competent to handle any number of large jobs at the same time, however distant, and with remarkable dispatch. Examine the list of work done, on the last seven pages of this pamphlet.



GALLATIN BANK, WALL STREET.

Furnished with the Durham System. Messrs. J. C. Cady & Co. Architects.

"Drainage and Plumbing."

The distinction to be made between these terms is this:

DRAINAGE includes the drains, soil-pipes, waste-pipes (from basins, baths, sinks, etc.), and trap ventilating pipes (for prevention of siphonage).*

PLUMBING includes hot and cold water circulation pipes, and the setting and attaching of fixtures.

A permanently perfect system of drainage is a vital necessity.

Defective plumbing causes annoyance and expense, *but may not be detrimental to health.*

This Company makes a specialty of constructing house drainage; by confining attention to one subject we have been able to increase the efficiency of the Durham System from year to year, and to reduce the cost fully one-half since its first introduction in 1879.

Drainage is of primary importance. If buildings are furnished with the Durham System the balance of the plumbing can be safely intrusted to local plumbers.

Submit plans to us for an estimate of cost *before letting any contracts.* If the expenditure for plumbing must be limited, curtail the amount rather than accept work of inferior quality.

The drainage system in new buildings should be placed in position about the time the roof is put on.

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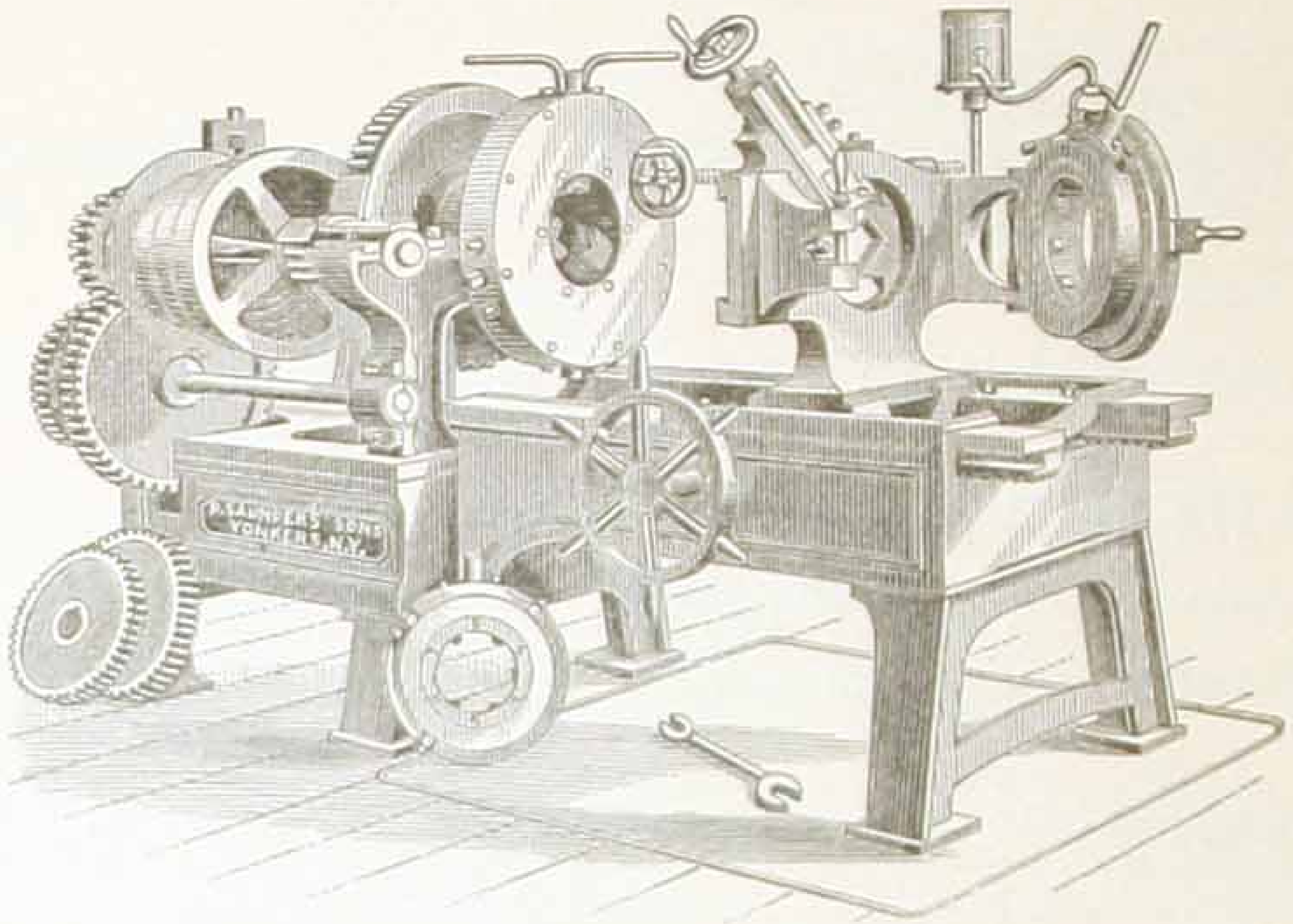
* See explanatory engraving, pages 16–17.



Machine for Cutting and Threading Wrought-Iron Pipe.

The Durham System

may be broadly described as a combination of scientific design, proper materials, and correct mechanical construction—*a common-sense application of obvious means to secure a result of vital importance.*

The design of the work, the materials used, and the workmanship employed are an entire departure from the ordinary plumbing practice.

The result attained is a system of pipes which are independent of the building for support, which cannot be cracked or broken, and whose joints are permanently gas-tight beyond the shadow of a doubt.

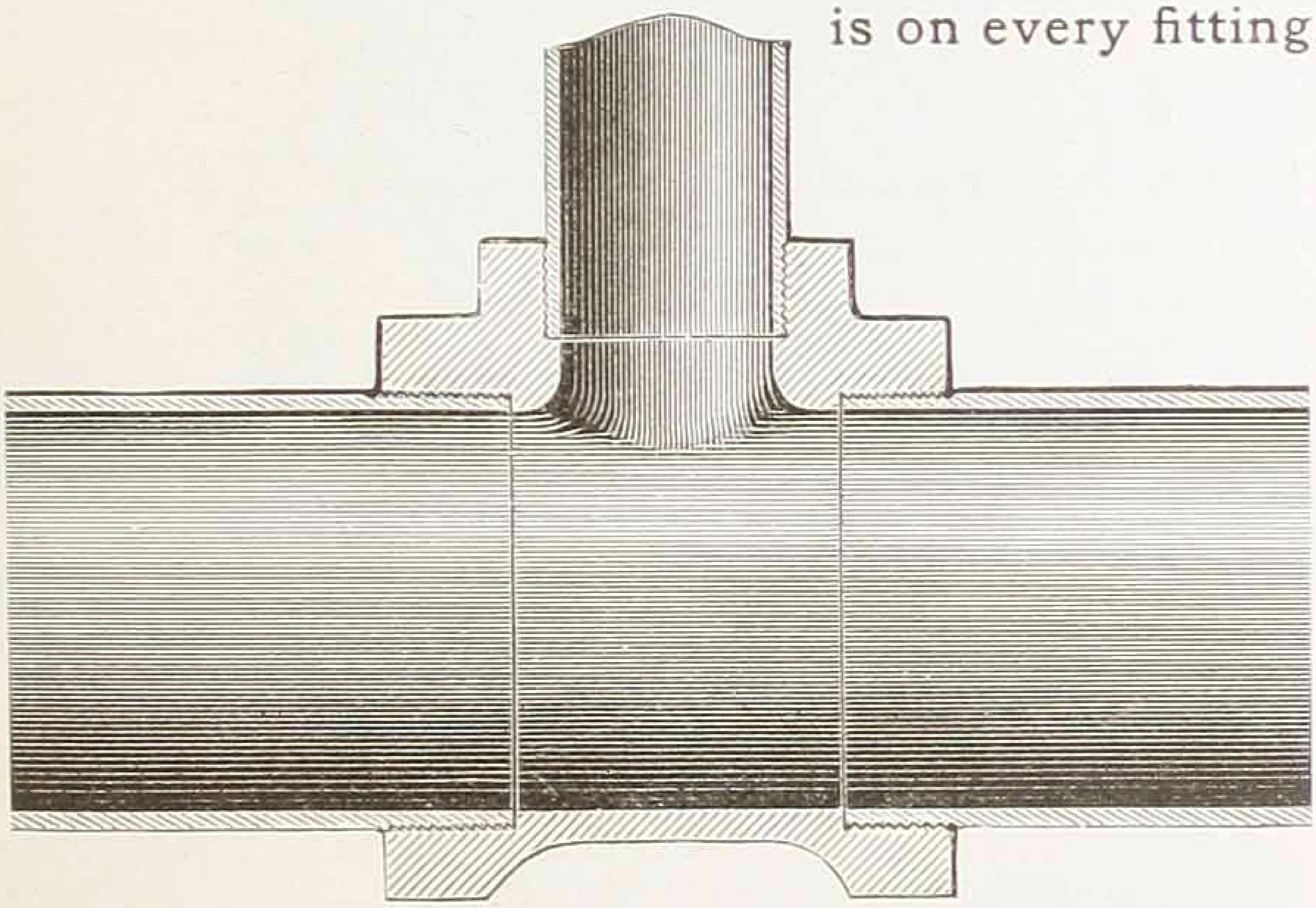
Proper mechanical construction is the foundation of good drainage. The Durham System is a *drainage apparatus* constructed with wrought-iron (steam) pipe and heavy cast-iron fittings of special shapes, *screwed together.* This apparatus, when erected in a building, is steam-tight, elastic under pressure, and at all points absolutely invulnerable; it will last a life-time, *without any outlay for repairs.*

PATENTED.—The Durham System is fully covered by patents. No patent could be obtained on the use of wrought-iron pipe, or screw-joints, for drainage purposes; but the combination of wrought-iron pipe and special screwed fittings, which constitute a "new and improved" drainage apparatus, is patentable. The cost of the Durham System to the public, however, is no greater for the patents. They were secured for protection, and are not used for extortion.

Durham fittings are manufactured solely by this Company, and cannot be purchased elsewhere. Imitations of the Durham System, constructed partly with ordinary steam fittings and other foreign materials, are occasionally palmed off on unsuspecting and too-credulous customers. **Order your drainage direct from this Company or its authorized agents; and see that our Trade Mark**

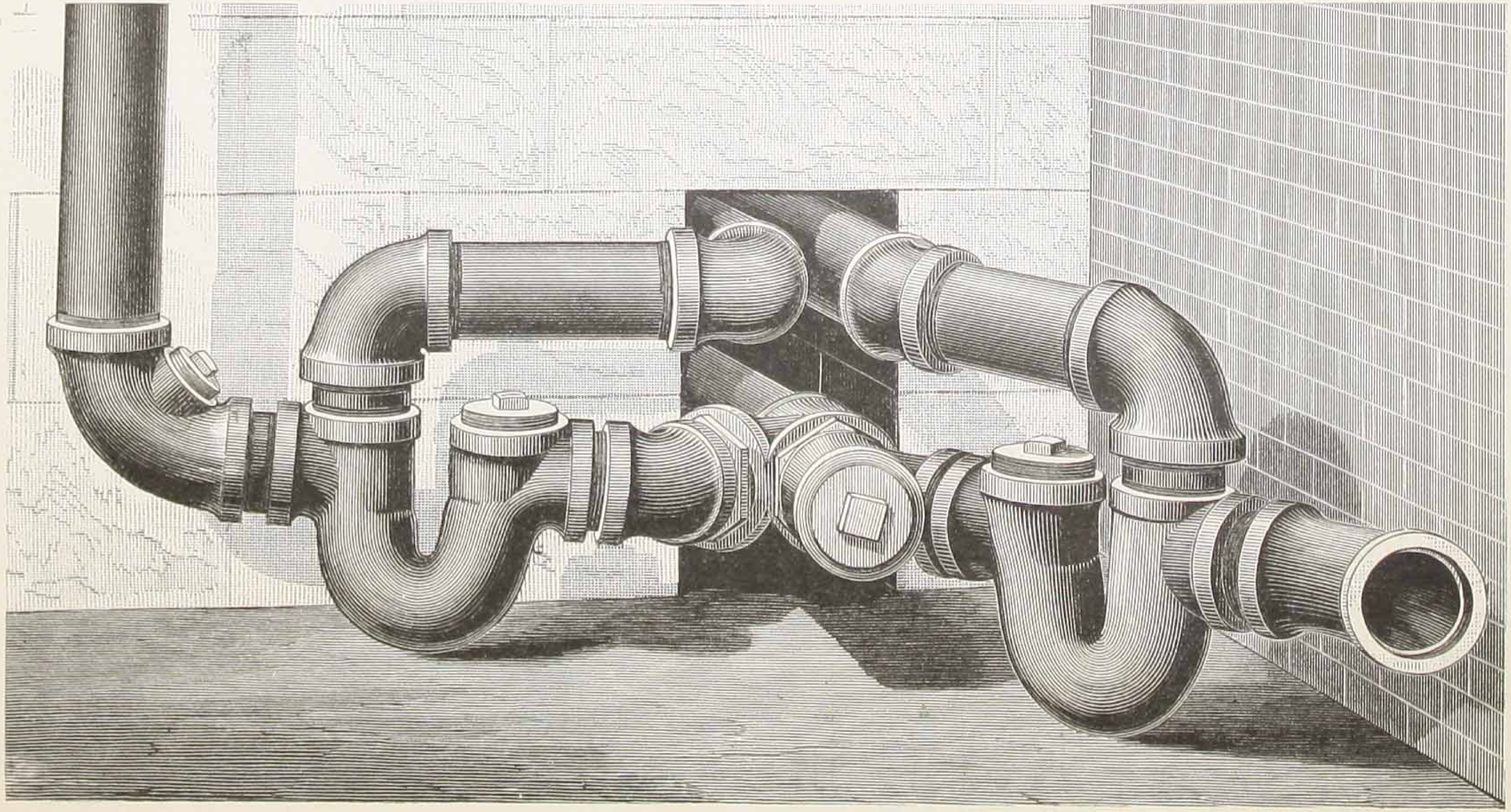
D. H. D. Co.

is on every fitting.



DURHAM DRAINAGE FITTINGS

are made with an **interior shoulder** (as shown in the cut above) securing a **flush inner surface.** Ordinary steam fittings have an interior depression and are not suitable for drainage purposes.



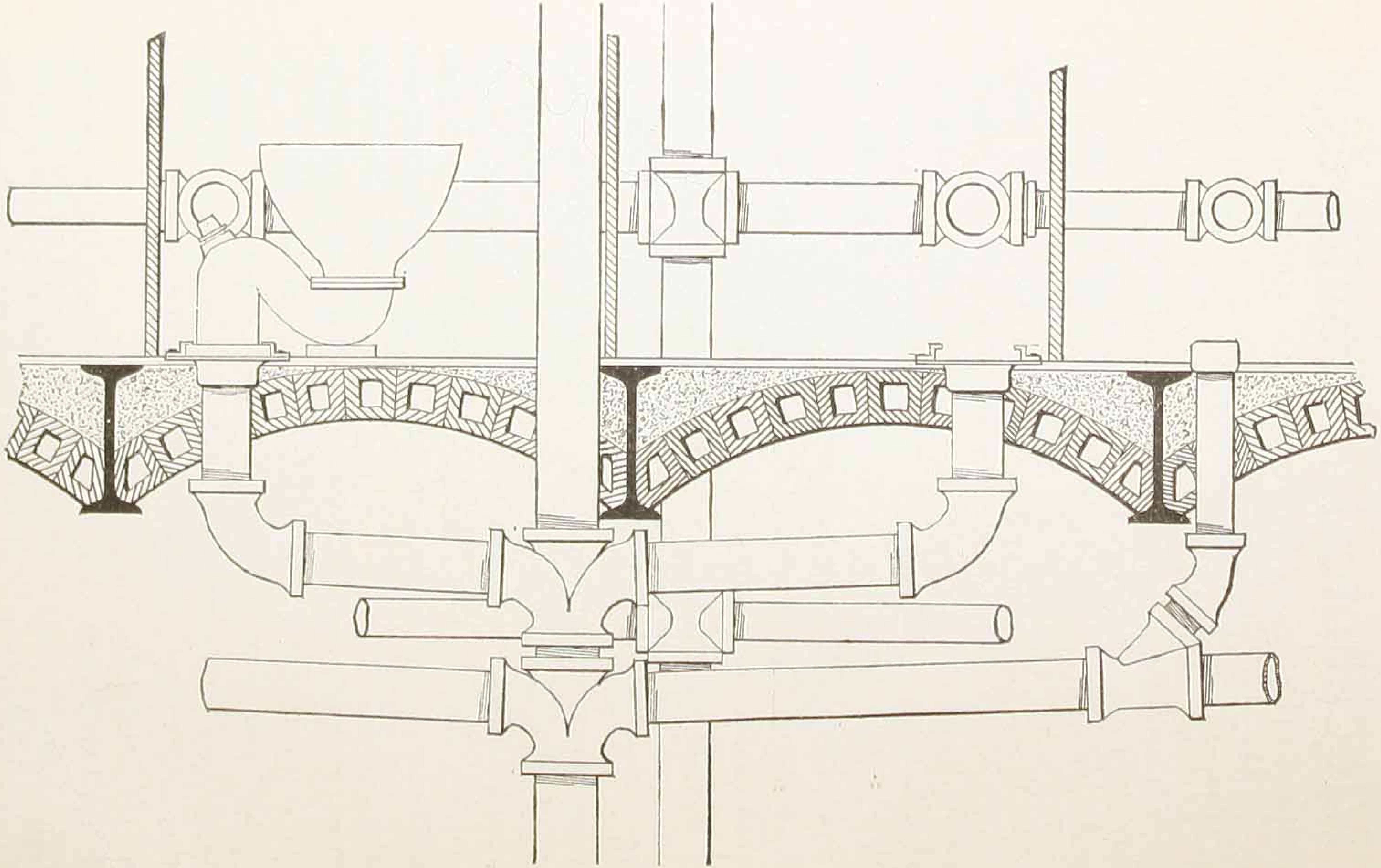
Sewer Connection (Durham System), NEW YORK CANCER HOSPITAL.—Mr. C. C. Haight, Architect.

Mechanical Advantages.

Joints: The screw threads on the pipes and in the fittings are cut by powerful machines, run by steam power, to standard gauge, so that they exactly correspond. The threads are tapering, so that the further the pipe enters the fitting the tighter becomes the joint between the two. The threads are first covered with a thick paste of red lead and oil, or coal tar, and the pipe then screwed *home* by means of steam-fitters' chain tongs, by which a man can exert a powerful leverage. This work requires no skill—merely strength—and it is done in a moment. *A laborer can make a tighter screw joint in one minute than a plumber with his materials could make in one hour.*

Exposing Pipes: Pipes should not be buried underground (within the building), nor hidden within the walls. It is a great satisfaction to be able at any time to examine drains and soil-pipes without the expense of tearing up. With the Durham System there is absolutely no objection to their being in plain sight everywhere; *there are no joints between floor and ceiling;* the pipes can be painted or bronzed, and do not betray their use or purpose in any manner. They simply look like steam pipes,—which they actually are,—and the public have long been accustomed to the presence of steam-heating pipes. In the New-York Cancer Hospital 3000 feet of our drainage pipes are in plain view, except where they pass through the floors. At the School of Mines, Columbia College, the store of Messrs. Brooks Brothers, 22d Street and Broadway, the De Vinne Press, and many other buildings, the Durham System is similarly arranged.

Smaller Pipes can be used because of the absolute interior smoothness—one inch in diameter less than is safe for plumbers' work. This effects a considerable saving. *One 3-inch pipe serves two houses at Pullman.*



General arrangement of Drainage and Trap Ventilation Pipes in the DE VINNE PRESS BUILDING, Lafayette Place and 4th Street, N. Y.
Messrs. Babb, Cook & Willard, Architects. (Printers of The Century Magazine.)

Changes and Additions of fixtures are easily and skillfully made, at very small expense, without disturbing neighboring joints. We have inserted water-closet fittings in the middle of soil-pipe stacks, one hundred feet high, at a trifling expense.

Hand-holes, closed by screw plugs, are provided at points where stoppage is likely to occur. The owner, with the aid of a wrench, can examine the interior condition of his drains, or remove an obstruction, without incurring a plumber's bill of expenses.

Tests can be made conveniently when the Durham System is finished, by screwing plugs into all openings and using an air-pump, or *filling the System with water to the tops of soil-pipes.* No other than a *pressure* test of drainage is of any value.

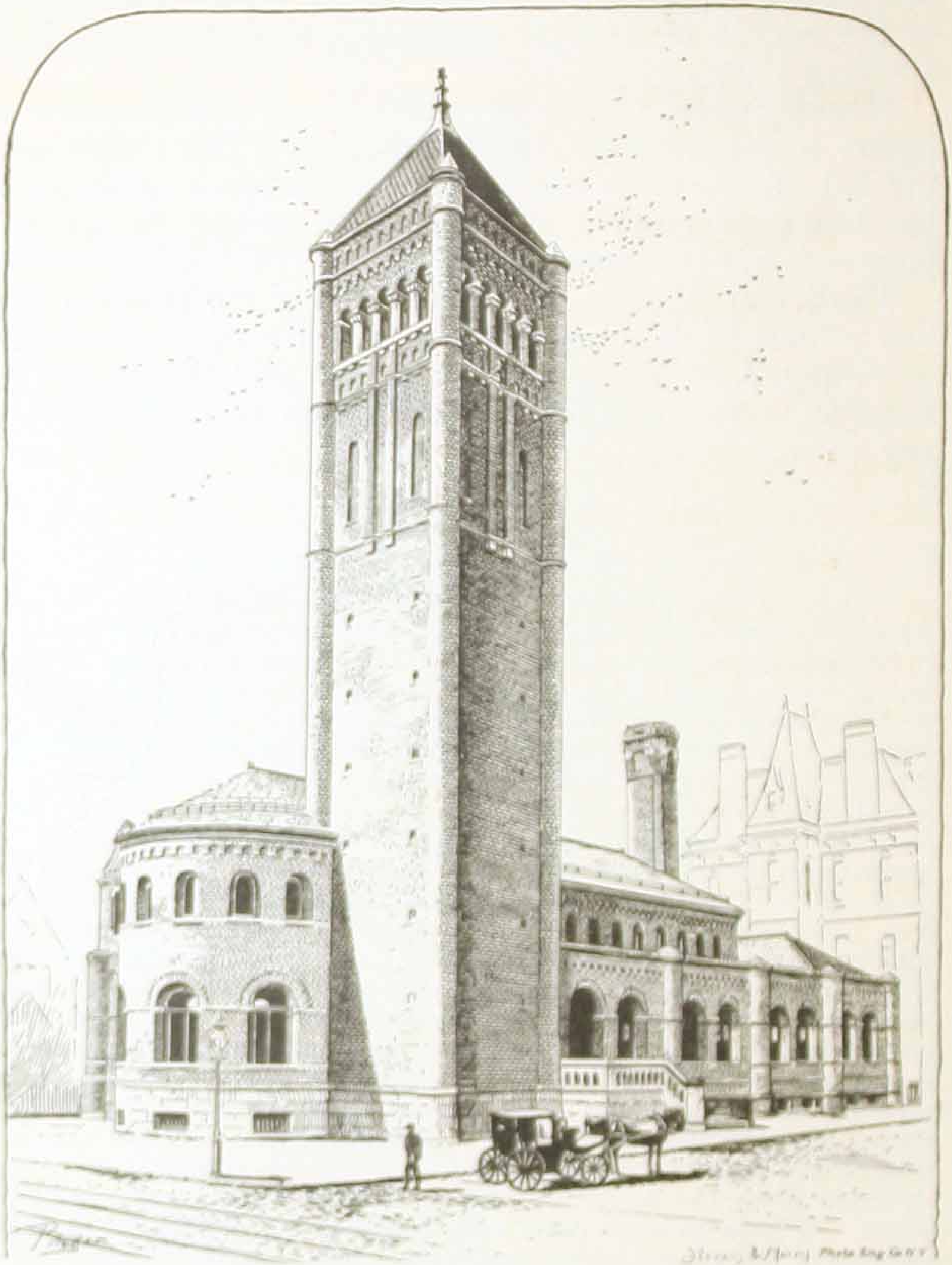
OPPOSITION

TO THE INTRODUCTION OF THE DURHAM SYSTEM.

With some honorable exceptions, the plumbing trade generally have vigorously opposed the introduction of the Durham System. This was to be expected, as innovations are objectionable to every well-established line of trade; and it is not in human nature to cordially welcome a loss or disturbance of business. The principal reason *alleged* for their opposition to a system of plumbing which is universally conceded by all *disinterested* persons to be the best possible, is that wrought-iron pipe is not suitable for the purposes of drainage, because *it rusts faster than cast-iron.* This is really a fact when both kinds of pipe are *unprotected* against corrosion. Tests have been made showing that cast-iron, unprotected, lasts, under certain conditions, one-fourth longer than wrought-iron. But when properly asphalted, painted or oxidized, wrought-iron pipe is now preferred by engineers for many uses for which cast-iron was formerly supposed to be indispensable; just as wrought-iron bridges have superseded cast-iron. The plumbers use arguments which were current ten years ago, and would create the impression that wrought-iron drains and soil-pipes will rust out in a few months, whereas asphalted pipe has an official record of 25 years *without appreciable decay!* Furthermore, plumbers themselves use wrought-iron pipe for gas and water; and with the growing practice of exposing, instead of hiding, drainage pipes, the owner can at any time make a hammer test of his pipes. If after 30 or 40 years a piece should be found rusted through, the cost of replacing it with a new piece would be trifling.

Thousands of miles of wrought-iron pipe are now in use, *buried in the ground,* for the conveyance of petroleum, natural gas, water and steam. *If cast-iron pipe were better, would it not be used?*

The economy of using a class of work which will require *no outlay for repairs* in a lifetime will be apparent to those who build wisely; while the superior hygienic conditions to be secured will appeal to those who recognize the importance of shutting out sewer air from their houses.



PRESBYTERIAN HOSPITAL DISPENSARY, NEW YORK.

Furnished with the Durham System. Messrs. J. C. CADY & Co. Architects.

Relative Suitability

OF WROUGHT AND CAST IRON PIPES FOR HOUSE DRAINAGE.

WROUGHT-IRON STEAM PIPE is

Elastic: springing, and not breaking, under pressure.

Of uniform thickness: being made from sheets of rolled iron.

Tested before using to **500 lbs.** pressure per square inch.

Made in long lengths, 17 to 24 feet, requiring few joints.

Standard in weight, thickness and quality.

Machine-made Screw Joints: not requiring skilled labor.

CAST-IRON PLUMBERS' PIPE is

Brittle: cracks easily from pressure, or a blow.

Not uniform in thickness: depending on the skill of the molder.

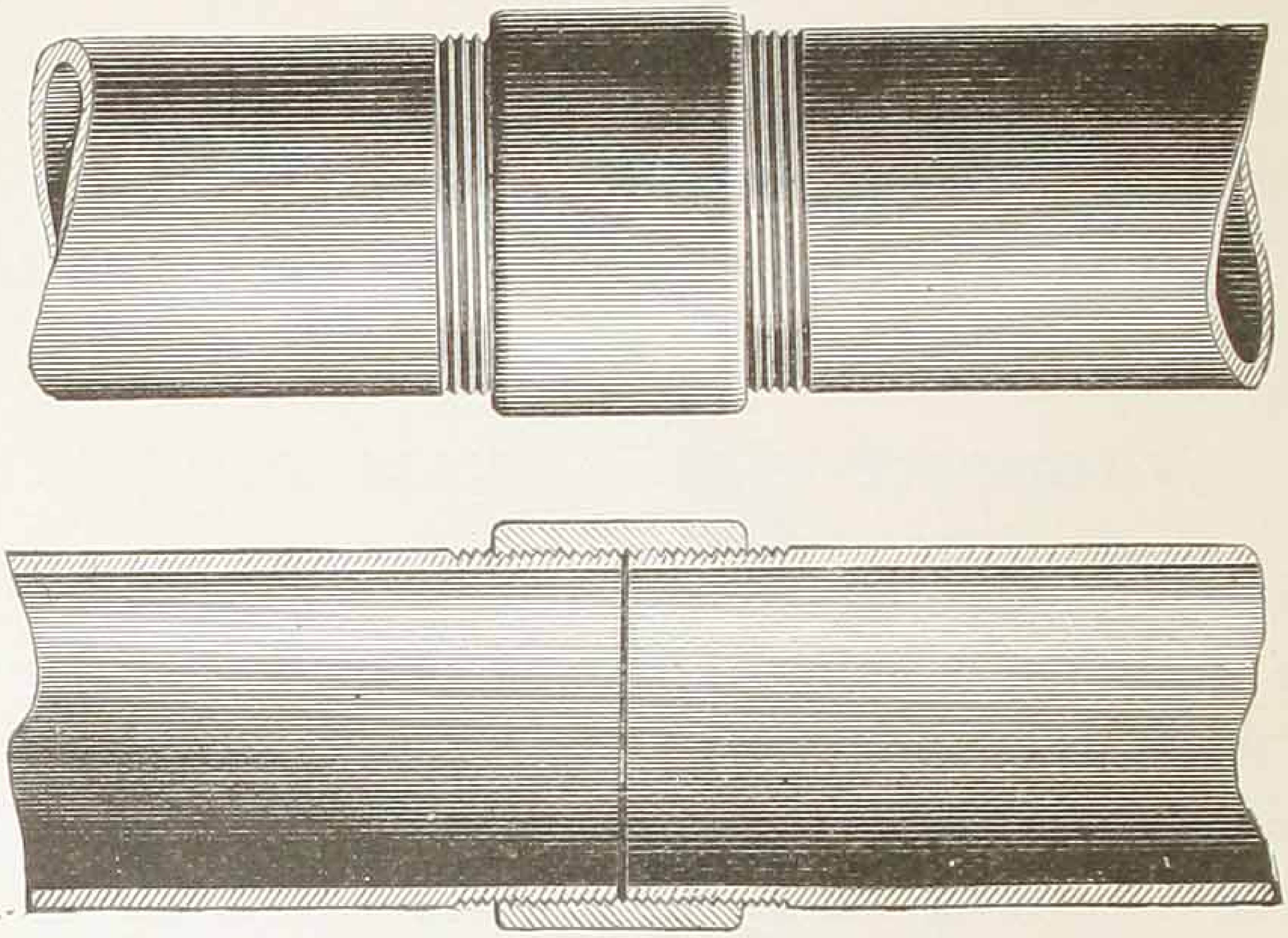
Not tested before placing on the market.

Made in short lengths, 5 feet, necessitating frequent joints.

Not Standard: is made "light," "medium" and "extra heavy."

Cut by Hand with a chisel; apt to crack in the operation.

Joints made with lead, and depending for effectiveness on the skill and honesty of the workmen, the *quality* and *quantity* of lead used and the favorable position of the pipes.



Two pieces of wrought-iron pipe screwed into a coupling or fitting become, practically, one piece; the joint is as strong as any part of the pipe.

Unsuitability of Cast-Iron Pipe.

Opinions of Sanitary Authors.

COL. GEO. E. WARING, JR., C. E.:

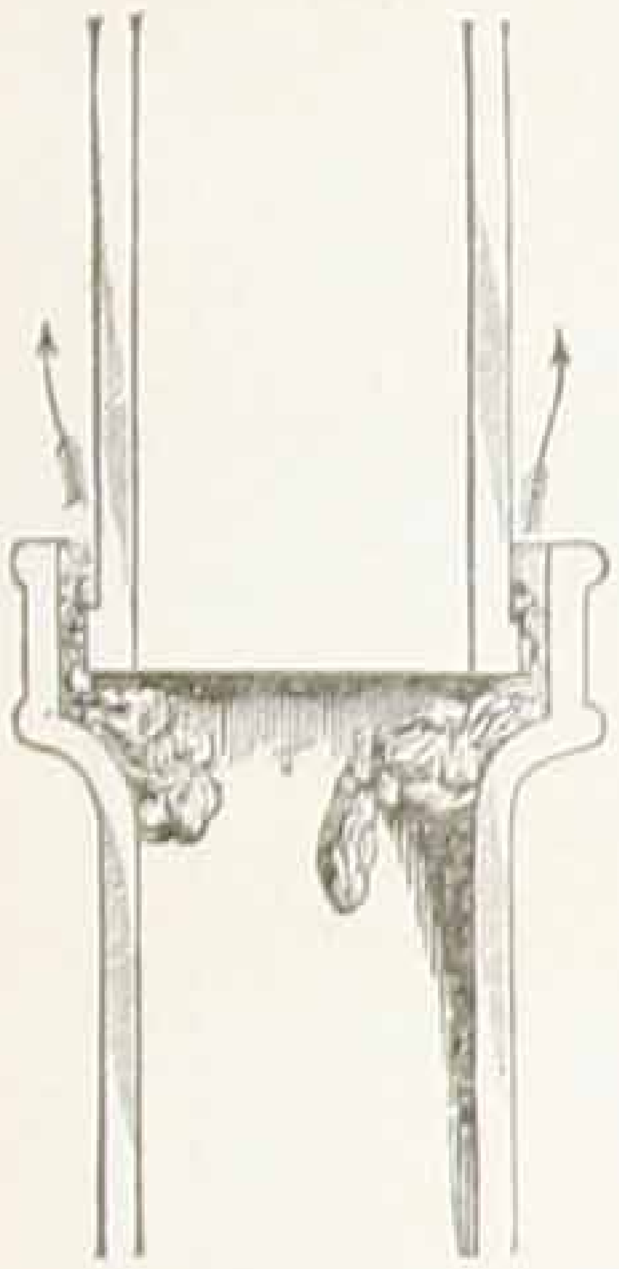
"Until quite recently I should have said that a soil-pipe jointed with calked lead was one of the most complete elements of satisfactory house drainage. Recent experience in testing such pipe, by closing their outlets and filling them with water, has led to the conclusion that of all the lead-jointed iron soil-pipe now in existence in American houses, not one in a hundred would fail to leak under the test. I have recently had occasion to test the soil-pipes of a large house of the best class, where the greatest effort was made to secure tight work, where the joints were so exposed that there was no difficulty in calking them thoroughly, and where there was every reason to suppose that every joint was absolutely tight. On closing the outlets and filling the pipes with water, the whole system leaked like a sieve. In some cases, in driving up the calking to make the joint tight, the pipes were split, owing to cracks previously existing, and which a casual hammer-testing would have discovered. *The result puts an entirely new aspect on the whole question, and points clearly to a radical defect of the manner in which all our soil-piping is done.*"

MR. J. PICKERING PUTNAM:

"Extra-heavy pipe and hubs are required to withstand the blows of the calking-tool. Lighter pipe cannot be made tight without danger of cracking the iron. It is now generally recognized and acknowledged that the plumbers' calked joint is rarely either air or water tight, though a vast amount of lead and labor is spent on them to make them so. When we reflect that the sole aim and object of a soil-pipe joint is to make a gas and water tight connection between the joints, we see the method commonly employed is an absurdity, and reflects little credit upon human ingenuity.

"Even supposing that, by chance, a calked joint can be made to stand the test which is now properly required of it when new, its tightness is very soon destroyed by the expansion and contraction of the pipes, caused by the passage through them of hot water or steam. The expansion of the spigot is in such cases greater than that of the hub, because it is on the inside, nearer the heat, and not protected, like the latter, from the hot fluids passing through the pipes. Hence the lead is temporarily compressed between the spigot and the hub, and, not being elastic, does not resume its original bulk when the pipes cool again. A minute opening is thus formed all round the spigot, and the pipe leaks.

"* * * Still another very serious objection is the temptation this joint opens for fraud. The lead may be partially or wholly omitted without very great risk of detection, since it is out of sight, and frequently immediately covered by a coat of paint. The calking may be still more easily slighted. If the hydraulic test is not demanded, a coat of paint or a little putty will easily make the joint stand the smoke or peppermint test. A few of the joints well within the reach of the house-owner may be filled with genuine lead, while those which are covered with floor boards, or are not easily accessible, may be composed of paper and sand and covered with putty.



"* * * Finally, the bell-and-spigot joint, when faithfully made, is very expensive, both in material and labor.

"* * * The writer has found bell-and-spigot pipes made by the best firms and sold for extra-heavy weight, no thicker than a piece of thick paper on one side and half an inch on the other.

"* * * It is much more unusual to find pipes of equal than of unequal thickness throughout.

"* * * The strength and thickness of a line of piping is equal to its thinnest part, as the strength of a rope is equal to its weakest part. Hence all the metal used in the piping of a house beyond the thickness of its thinnest part is thrown away. *Of what use is it to pay for extra-heavy pipes, when one side of most of them is extra light?*"

MR. ERNEST W. BOWDITCH, C. E. (abstract of a paper read before the Boston Society of Civil Engineers; from *The Sanitary News*):

"Mr. Bowditch said that, perhaps, the principal annoyance resulting from plumbing is due to the soil-pipe or some of its fittings. Second quality of iron, poor hanging, insufficient calking, careless mechanics, and putty, cement, rag, or paper joints are some sources of the trouble. He had specified tar-coated soil-pipe frequently, until one day he discovered a cracked elbow which had been tarred over. Since then he has specified plain pipe, and has subjected it to a test, which consists in swabbing out each pipe with raw linseed oil and allowing it to stand a few hours. Plain pipe is better to calk than tarred, because the lead clings to clean iron better than to tarred. Sandholes and small cracks are not easily discovered in tarred pipe. Mr. Bowditch exhibited a length of ordinary 'heavy 4' plain commercial soil-pipe, which had been subjected to the oil test, and upon which were shown the leaks and their area, marked by chalk lines.

"Concerning the statement that all soil-pipe is tested to a fifty-pound water-pressure by the manufacturers, Mr. Bowditch stated that he had seen a length of soil-pipe, five feet, that would not bear the pressure of a column of water its own height without leaking."

MR. JAMES C. BAYLES:

"In architects' specifications we seldom find a suitable weight of iron called for. Consequently, the principal demand is for cheap and light pipes. As made, they are as hard as chilled iron—owing to the fact that they are cast so thin—and about as brittle and difficult to cut as glass. If dropped, they crack or break, and are utterly untrustworthy at all times."

MR. W. PAUL GERHARD, C. E.:

"The better grades of soil-pipe, the *heavy* and *extra heavy*, the price of which is about double that of light pipe, are usually specified only for public or other large expensive buildings. My experience with extra-heavy cast-iron soil-pipe warrants me in saying that even the latter is very often *decidedly bad*, having an uneven thickness of metal, and consequently being in its weakest part no thicker than light pipe."

Durham System

IN A CITY HOUSE (NO SCALE).

A. Sewer.
A–C. Drain; the portion between the sewer and the running trap, B, is called the "sewer connection."
B. Running trap, to prevent air from the sewer passing into the pipes within the building.
B–K. Air-inlet pipe, for ventilation (see note, page 18).
C. Soil-pipe elbow, with hand-hole for cleaning out, closed by screw plug. The drain must have a regular fall, or grade, and this elbow provides for that.
C–D. Rain water leader; not necessarily part of the Durham System.
E. and G. Y branch, close nipple and 45° elbow; connecting drain and vertical pipe. Serving same purpose as C.
E–F. Soil-pipe, 3, 4, 5, or 6 inches in diameter; pipes draining water-closets are called "soil-pipes," those draining other fixtures "waste-pipes."
F and H. Roof connections (see note, page 18).
G–H. Waste-pipe, 2 or 3 inches diameter; enlarged at upper end to prevent freezing in very cold climates.
K. Air-inlet box (see note, page 18).
L. Double and single Y branches to receive waste-pipes from baths, bowls, or sinks. The plumber makes this connection, always trapping the lead waste-pipe and then soldering it to a *brass* nipple screwed into the Durham fitting.
M. Ventilation Tees and Y's (see note, page 18).
N and O. Water-closet flanges (see note, page 23).
P. Water-closet Tees, with right-hand bath inlet.
R. An offset; these should be avoided when possible.

H
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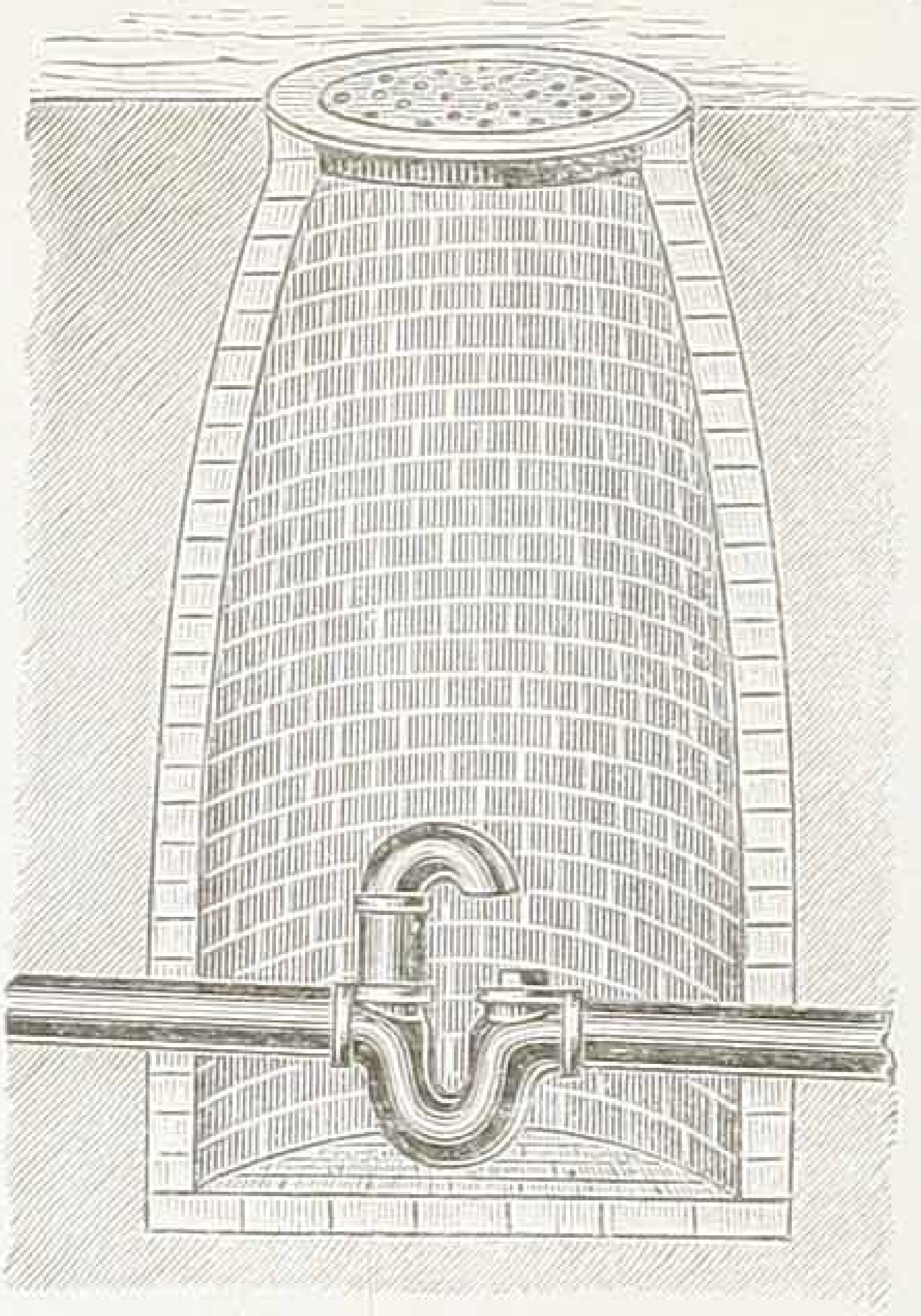
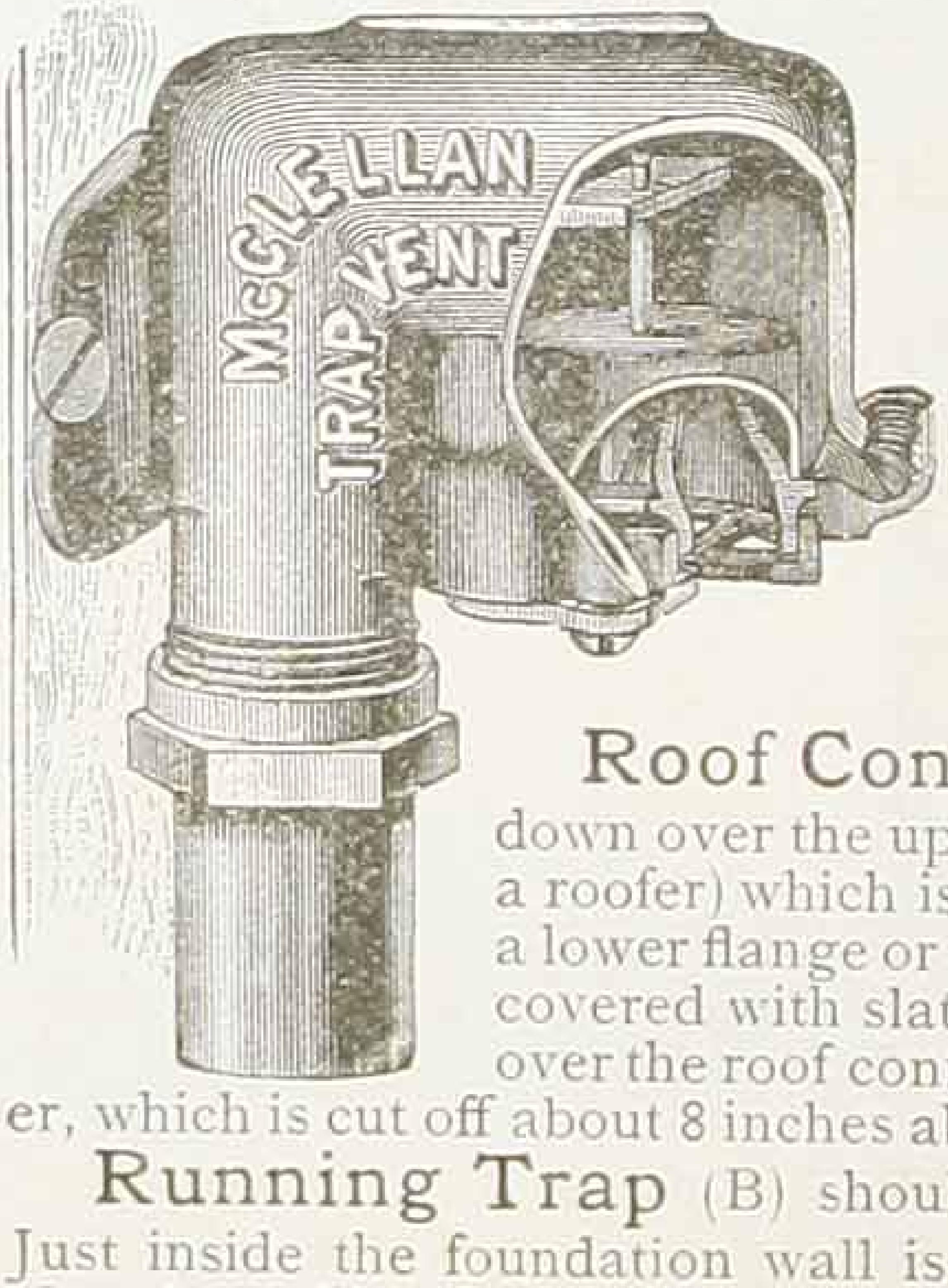
Explanatory Notes.

The Air-inlet for the ventilation of the drainage system can be arranged in a variety of ways. At pages 16-17, the air-pipe is shown running to an iron box, with grated cover at the curb—as far from windows as possible. At page 24, it is shown running to the face of an outer wall, finished with a brass grating screwed into the *coupling* at the end of the pipe, and presumably away from the vicinity of windows. Ordinarily the current of ventilation is inward, but a heavy discharge of water above will momentarily drive the air outward. The London *Lancet* insists upon the extension of the air-pipe upward to the roof from B, but this would interfere somewhat with the circulation. In country houses both the trap and air-inlet can be placed at a distance from the house, inclosed in a brick man-hole, with ventilating cover. In extremely cold climates the air-pipe should join the drain a few feet distant from the trap. Under some circumstances both the trap and air-inlet can be dispensed with to advantage. No running traps were used at Pullman; the suction of the sewage pumps creates a down draft through the soil-pipes and effectually ventilates both the street and house drains.



Trap Ventilation Pipes are not shown in the engravings. Authorities disagree as to their value. They are commonly considered necessary to prevent *siphonage*, but the objection to them is that they cause the loss of water seal by evaporation. If a reliable *non-siphoning* trap exists it would be better to use it. We always insert the necessary fittings to receive vent-pipes, and if not used they can be plugged. We put up these pipes if desired, or, if more convenient, furnish the necessary material to the plumber.

The McClellan Anti-siphon Trap Vent has been allowed as a substitute for trap ventilation pipes by the New-York City Board of Health.

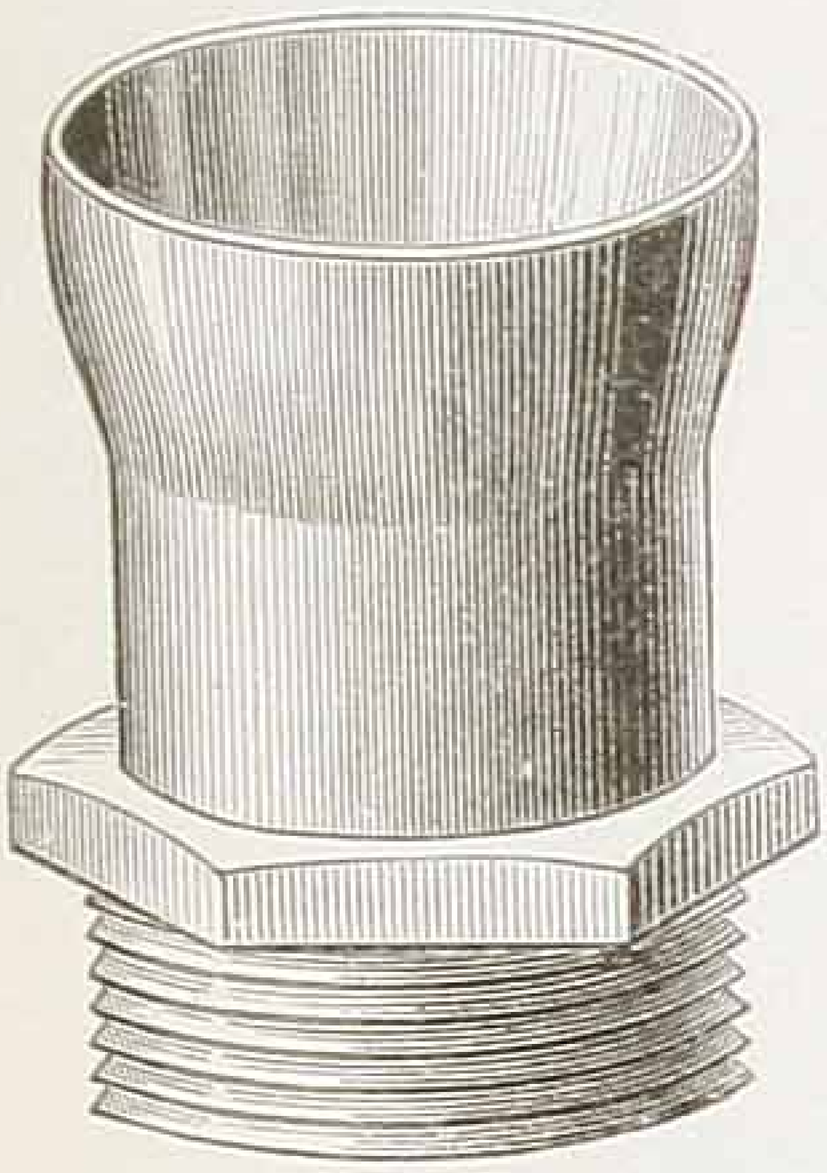


Roof Connection.—This is an iron cap to screw down over the upper edge of a lead or tin *flashing* (made by a roofer) which is dropped over the end of the pipe and has a lower flange or base which can be soldered to a tin roof, or covered with slates or shingles. A *coupling* is screwed on over the roof connection if it is desired to run the pipe higher, which is cut off about 8 inches above the line of the roof on the upper side.

Running Trap (B) should always be accessible without trouble. Just inside the foundation wall is the most convenient location for it. If placed outside of the house, a man-hole should be built around it, with an iron cover.

Within the house wrought-iron pipes and screw joints only should be used. If the drain *must* be placed under the cellar floor, we advise the use of wrought instead of cast iron pipe, as being in every respect more satisfactory.

Outside the house the iron pipe should be carried just as far as it is desired to prevent leakage, *especially past wells*. There is nothing to be saved by using clay pipe, although the first outlay is less. In the best work we run the wrought-iron pipe all the way to the sewer or cesspool.

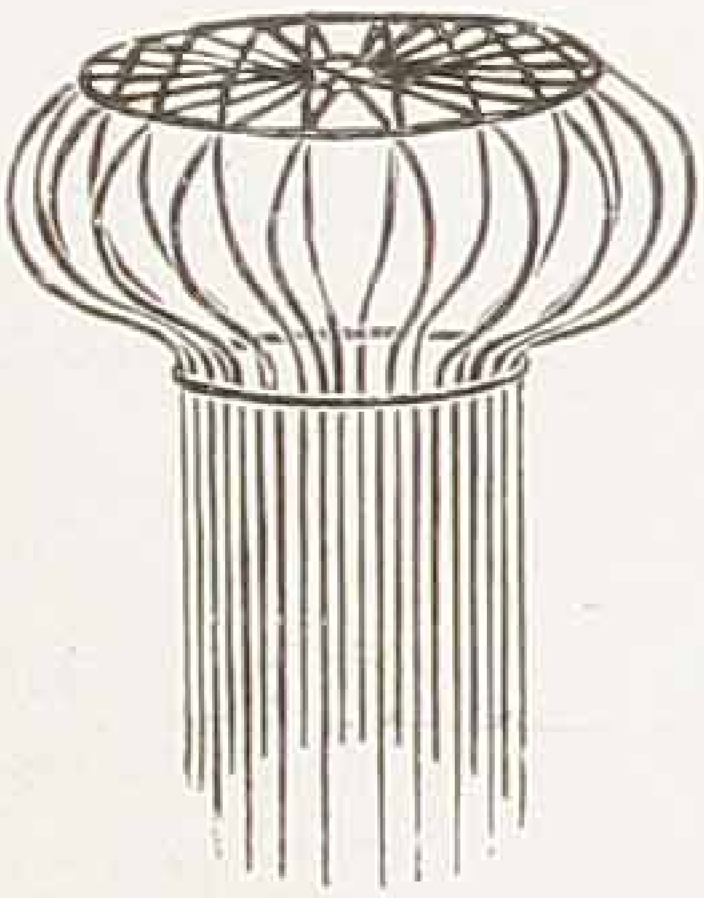


Brass soldering nipples must be used to connect the short lead waste-pipes from baths, bowls, sinks, etc., with the Durham screwed fittings, and also to connect the trap ventilating pipes. Lead pipe can be soldered to brass, but not to iron. These nipples can be purchased from the Company or from any dealer in brass goods.

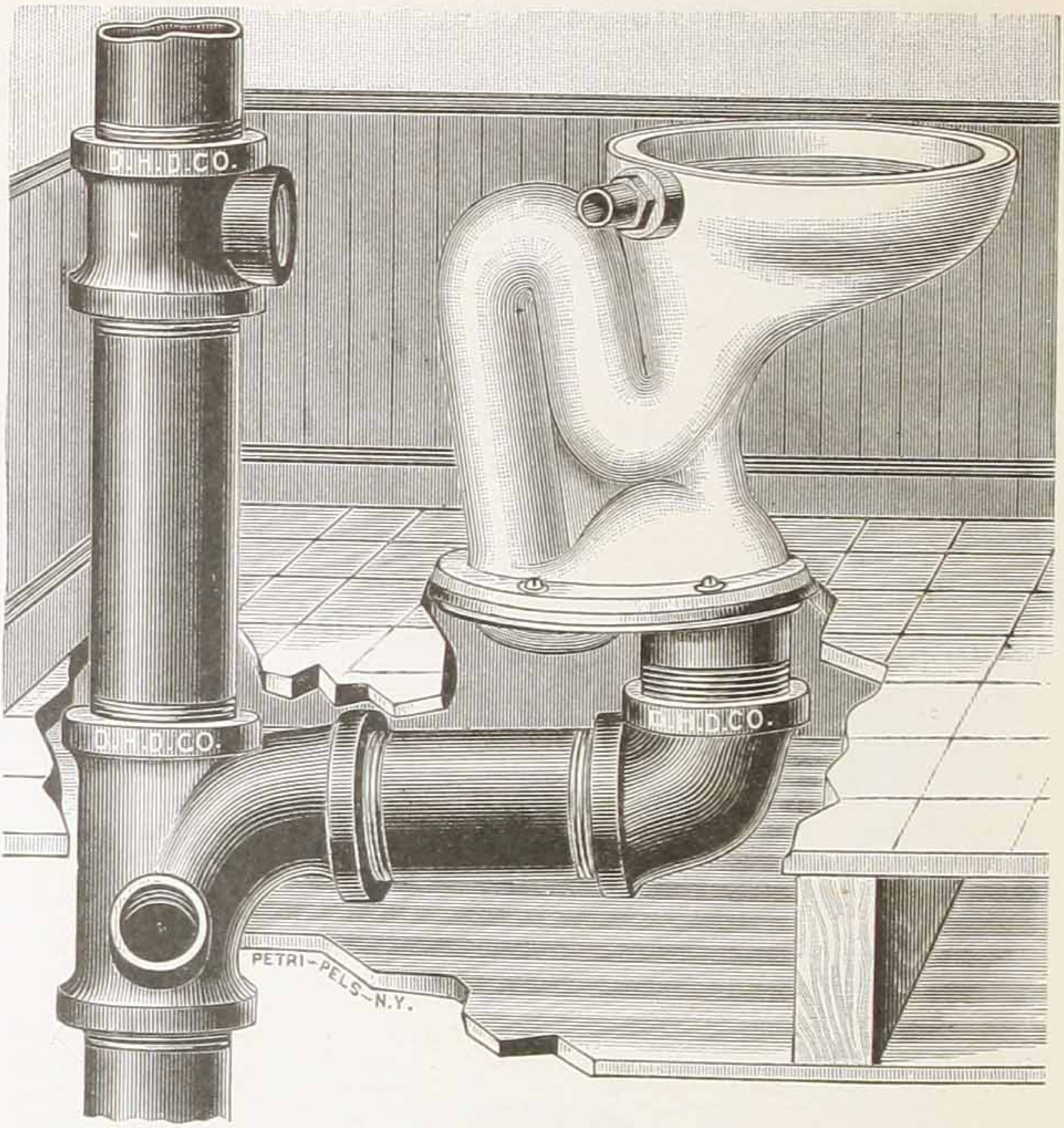
Water-closets of any make can be used with the Durham System. We must know what closet is to be used in order to drill the iron flanges of the water-closet elbow to fit the flange of the closet. We can furnish clamps or set-screws to fasten the closet to our fitting securely. Use a stiff mixture of red-lead and putty between the latter.

Grade of Drain.— Our fittings are cut to a fall of one-half inch per foot, but any grade desired can be obtained by a combination of fittings. One-quarter inch per foot should be a minimum fall.

Tops of soil-pipes should be left open, and not obstructed by a return bend. If there is danger from leaves falling into the pipes, copper or galvanized iron wire baskets can be used. *Nothing is gained by using any contrivance for increasing the upward current of ventilation in a soil-pipe.*



Fuller information furnished on any point by correspondence. Drainage plans and estimates of cost submitted without any obligation on the part of the inquirer.


D.H.D.CO.
D.H.D.CO.
D.H.D.CO.
PETRI-PELS-N.Y.

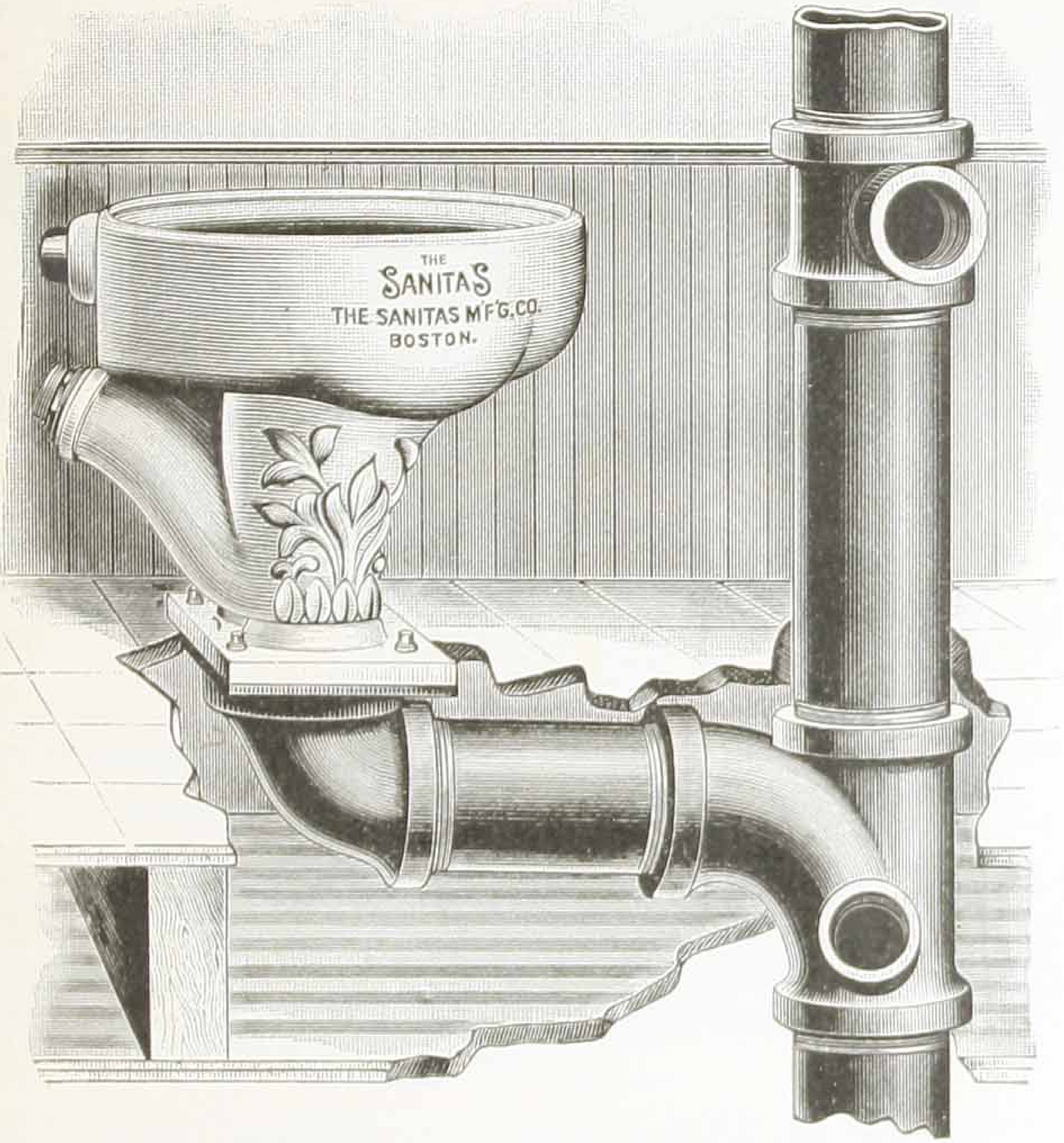
Illustrations of Water-Closets, and the Method of Supporting and Connecting them.

Any kind of water-closet can be used with the Durham System. Where a peculiarity exists we prepare special patterns.

Our patented method of supporting the closet on a rigid branch from the soil-pipe, instead of resting it on the floor, insures permanently tight joints between the closet and the soil-pipe.

In old-style work the water-closet rests on the floor, and is connected with the soil-pipe by means of lead pipe and lead joints; the shrinkage or settling of the floor breaks the joint.

NOTE.—For the convenience of customers, we will supply plumbing fixtures at manufacturers' prices. The price of the "Dececo" (illustrated above), with iron cistern, pull, chain, and brackets, boxing and cartage, is $42.00. The "Dececo" is the invention of Col. George E. Waring, Jr., and is considered the best *siphon* closet.



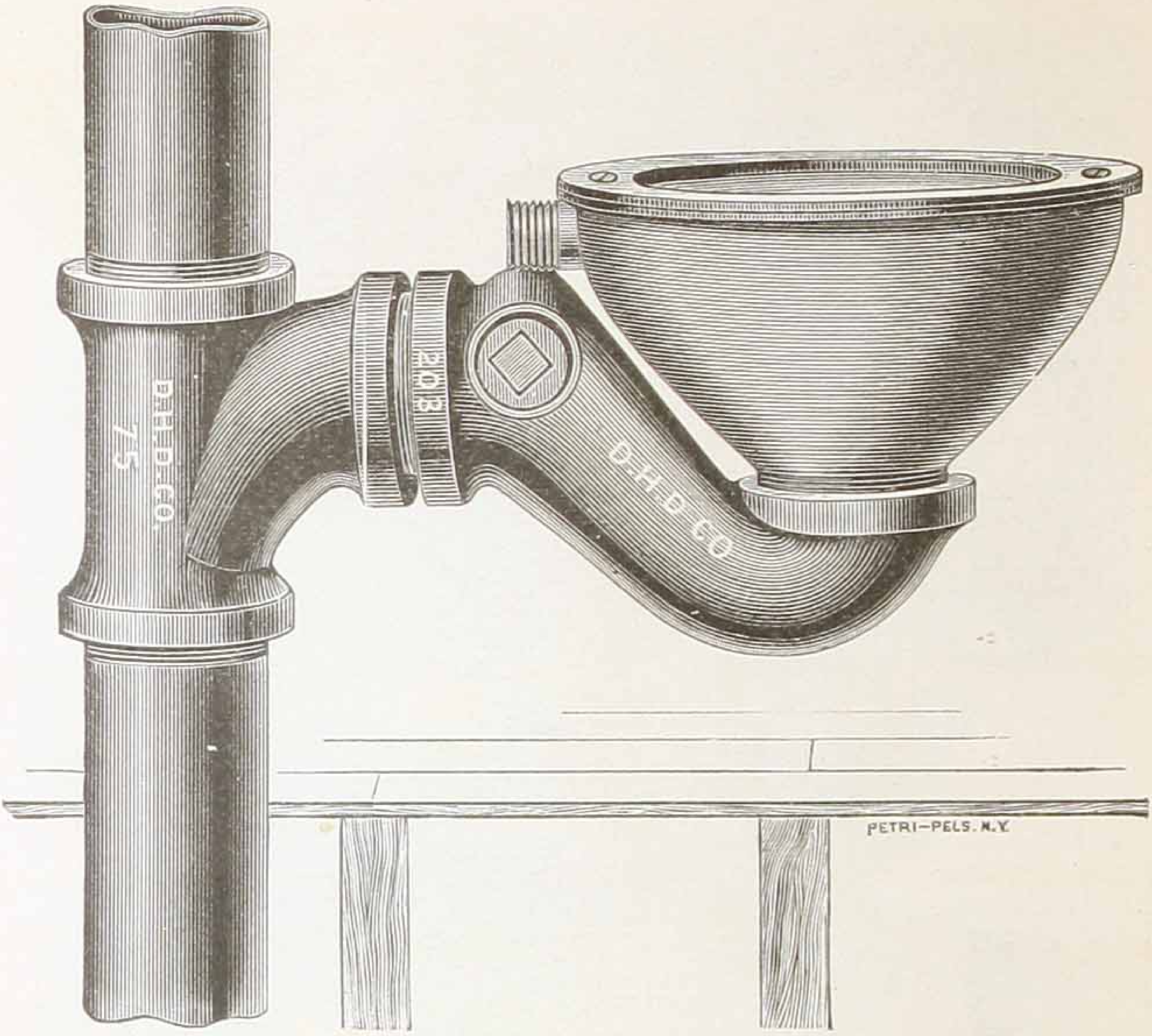
The illustrations clearly show the *simplicity*, *economy* and *durability* of our method of construction.

The branch to the water-closet has a grade, or rise, of one-half inch per foot from the water-closet tee to the water-closet elbow. The flange of the latter is level, and adjustable in any direction.

A stiff paste of red lead and putty should be used between the flange of the fitting and the base of the water-closet, to neutralize the inequalities of the latter.

NOTE.—The Sanitas Mfg. Co., 207 Tremont Street, Boston, manufacture the plumbing fixtures invented and developed by Mr. J. Pickering Putnam. The "Sanitas" closet is flushed *(noiselessly)* by the discharge of the water held in the service *pipe*, for a height of six feet—instead of from a service *box*. This closet is of the first class. The price is $47.25 with cistern, complete.

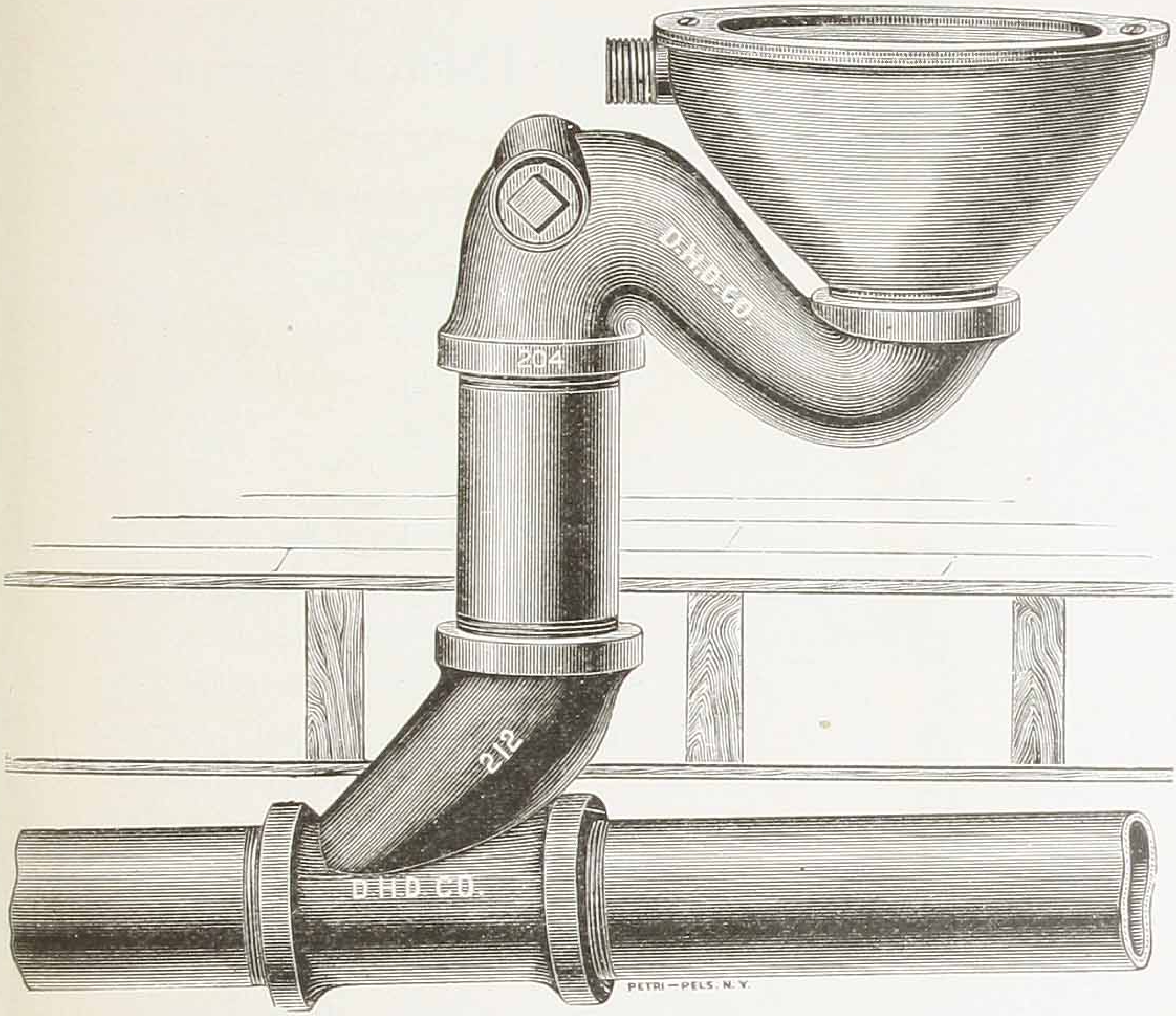
The J. L. Mott Iron Works, 88 and 90 Beekman Street, N. Y., furnish *imported* earthenware wash-out closets, as follows: INODORO (back outlet), $38; TRIPLEX (side-outlet), $36; DOLPHIN, ivory tinted (front outlet), $41, with iron cistern, pull, chain and brackets, boxing and cartage. These are the best examples of this popular type of closet.



Screw-Joint, Short Hopper Water-Closet.

This closet was designed by us for the New-York City Board of Education, for use in the schools as a substitute for school sinks, and manufactured for that purpose. As it possesses some unique advantages we present it to the attention of the public.

The iron bowl of the closet has a thread cut on its neck to correspond with the threaded inlet of the trap into which it screws; the threaded outlet of the trap is firmly connected with the similarly threaded Y fitting in the soil-pipe by a short piece of pipe (*nipple*), threaded at both ends. The screwing together of the three parts (which can be done in a moment) completes the setting of the closet. The trap has a double 2-inch threaded vent connection, plugged; by removing the plugs and running a bar through the holes as a lever the trap can be screwed on securely without the use of any other tool. The closet can be supplied with water under pressure by using any kind of water-closet cistern, or (primitively) by inserting a long-handled stop-cock in the


D.H.D.CO.
204
212
D.H.D.CO.
PETRI—PELS, N.Y.

supply-pipe. It is practicable to supply farm-houses or pioneer dwellings with our drainage system and water-closet without the aid of any skilled labor. Some intelligence in taking measures for the piping, and a little "gumption" in mechanics is all that is required. The cost of a simple drainage system, including the water-closet, where not more than 30 feet of pipe is required, is only $30.00 for the materials, ready to screw together.

For schools, factories, asylums, tenements, stables, stores, and many other purposes this closet commends itself for cheapness, simplicity, and durability. In its more expensive form of finished brass, nickel plated, it is the most sightly closet made.

PRICES.

Cast iron, painted, trap and bowl, - - -	$ 9.00
" porcelain lined, trap and bowl, - -	11.00
Brass, highly finished, nickel plated, - - -	50.00

The Durham System.

Diagram of a simple system of screw-jointed house drainage of 4-inch wrought-iron pipe.

A. Air-inlet pipe.

B. Running trap.

C. Soil-pipe elbow, with hand-hole.

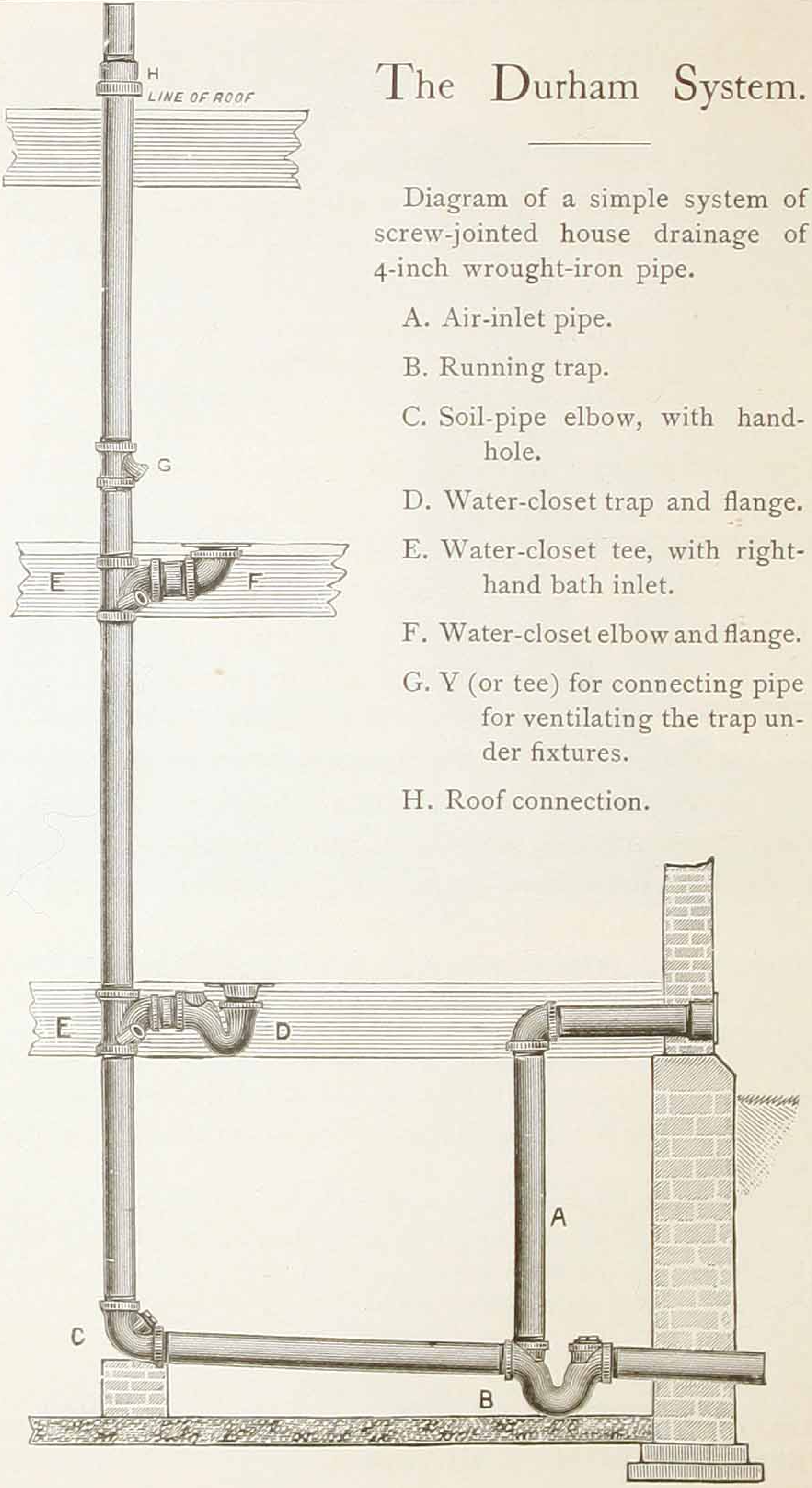
D. Water-closet trap and flange.

E. Water-closet tee, with right-hand bath inlet.

F. Water-closet elbow and flange.

G. Y (or tee) for connecting pipe for ventilating the trap under fixtures.

H. Roof connection.



Drainage for Shipment.

THE DURHAM HOUSE DRAINAGE COMPANY are prepared to fill orders for complete systems of Durham Drainage for shipment to **ANY PART OF THE WORLD,** ready to be screwed together in the building. We have shipped work to 34 States and Territories.

On receipt of rough sketch, showing about what is wanted, and giving approximate distances, we will send a diagram and quote a price for the complete work with all pipes, cut to exact measure, ready for erection. We never have any difficulty in sending work to fit the place intended for it.

The advantage of using the Durham System where it is difficult to secure skilled labor, in the country or abroad, aside from its sanitary superiority, consists in the fact of its being quickly and easily erected by common labor. The joints are practically made in the machine shop. The work shown on the opposite page could be put in place in 5 hours by a man and helper. The threads being covered with a paste of red lead, and the pipe screwed *home*, there can be no question of the strength and tightness of the joint.

The measurements required are on center line of drain and soil-pipe, from floor surface to floor surface upward to the roof, and the distance outward from the soil-pipe through the outer wall. Also the height above drain of the air-inlet. We also require to know what make of water-closet is to be used, and full particulars of all fixtures which are to be connected with either the soil-pipe or drain. Fittings to receive waste-pipes from sinks, bowls or baths can be provided at any point.

Examples of Cost.— The amount of work shown on page 24 can be furnished free, on board, in New York, for $62.00, in 3-inch, and $80.00 for 4-inch, with 50 lineal feet of asphalted pipe. With fittings for one water-closet only, the prices would be $52.00 and $70.00.

Three-inch pipe is the size ordinarily used for dwellings, except in cities with plumbing regulations, when 4-inch is the minimum size allowed for cast-iron soil-pipe, and, of course, for wrought-iron pipe also.

Workmen furnished to put up work at cost of wages and traveling expenses.

A STREET IN PULLMAN.—From *Harper's Magazine.*

SIGNIFICANT RESULTS

FROM THE ADOPTION OF THE DURHAM SYSTEM FOR AN ENTIRE CITY OF 1600 BUILDINGS.

"**The City of Pullman** has now been in existence six years, and its population is about 9000—a period sufficiently long and numbers great enough to eliminate any exceptional conditions which might obtain. The death-rate of the town of Hyde Park—of which Pullman is legally and territorially a part, in which the same natural conditions exist, and which is occupied by substantially the same kind of population as that of Pullman—averages fifteen per thousand annually, according to the last report of the State Board of Health. In Pullman, the deaths have ranged from

6.9 to 7.6 IN EVERY THOUSAND

MECHANICS' HOUSES IN PULLMAN.—From *Harper's Magazine.*

OFFICE, DEPARTMENT OF DOCKS, N. Y. CITY.
PIER A, NORTH RIVER.
Furnished with the Durham System of House Drainage.

of population, or less than one-half the deaths in the territory immediately surrounding the town. The average for American cities is over three times this number, and the average annual death-rate of the world is thirty-two out of every 1000 of population. The average death-rate in the city of Mexico is fifty-six per 1000, or eight times the rate in Pullman. The healthful conditions here are unequaled by those in any city in the world. The lowness of the death-rate is remarkable. With one-quarter of the physicians that ordinarily minister to a population of this size, Pullman has only a little more than one-quarter of the deaths usual in the same number of people." —*Dr. Oscar C. De Wolf, Commissioner of Health, Chicago, before the American Institute of Architects.*

Mr. Benezette Williams, C. E., who had charge of the drainage and water supply at Pullman, says of the Durham System:

"I advised its use for the reason that I consider it the nearest perfect of any work used for such purpose, owing to the absolute certainty of securing tight joints, if ordinary care is used; and for the further reason that the material used, and the method of supporting the closets, are superior to what is in ordinary use.

"*Great satisfaction has resulted from the use of the work at Pullman.*"

The Pullman Company recognized the advantage of securing **PERMANENTLY PERFECT** house drainage work; the saving in repairs (which results) makes the Durham System the most economical work to adopt.

STANDARD DRAINAGE.

The Durham System means one thing: price depends on quantity only, the quality is always the same. The drainage of the mechanics' houses at Pullman was of the same materials and class of workmanship as in the most costly buildings illustrated in this pamphlet. *Uniformity of workmanship is a natural result of the use of machine work in place of skilled labor* —which is possible only with the **SCREW JOINT.**

Partial List.

The Durham System has been furnished to the following **Corporations, Firms,** and **Individuals,** *to all of whom we refer.* We have no dissatisfied customers.

United States.

New Pension Building: Washington, D. C.; Gen. M. C. Meigs, U. S. A., Superintending Engineer and Architect.
Officers' Quarters............*Teale & Cregin;* Willet's Point, L. I.
Hospital.. " "
Mess Hall.........................David's Island; New York Harbor.
Naval Hospital: Chelsea, Mass.; *Frank O. Maxson, C. E., U. S. N.*
Post Offices at many cities.

New York City.

City of New York.........Dept. of Docks; Office Building at Pier A.
Columbia College...............School of Mines; *Mr. C. C. Haight.*
Brooks Brothers.....Store, 22d St. and Broadway; " "
Down Town Association........................ " "
New York Cancer Hospital.................. " "
Warehouse: 149–151 Franklin St................. " "
Presbyterian Hospital.................Dispensary; *J. C. Cady & Co.*
Gallatin Bank..............10-story office building; " "
St. George Apartment House................. " "
The Randolph Apartment House.....................*T. M. Clark.*
Suburban Rapid Transit Co..........*J. J. R. Croes, Chief Engineer.*
Hoffman House......................New Extension; *John B. Snook.*
The De Vinne Press.........Lafayette Place; *Babb, Cook & Willard.*
Roswell Smith......................Residence; " "
Theo. L. De Vinne................ " " "
Isaac V. Brokaw: Residence; Fifth Avenue and 79th Street; *Rose & Stone.*
Consolidated Electric Light Co.......Factory; *A. Page Brown.*
Grammar School, No. 9..................Geo. W. De Bevoise, Supt.
" " 138th Street.......... " "
" " 96th Street and Lexington Avenue; " "
W. J. Merritt & Co..................7 Residences; West 73d Street.
Charles A. Dana........Residence; Madison Avenue and 60th Street.
Charles Buek & Co.: 6 Residences; Madison Avenue and 60th Street.
Messrs. Farley & Son...8 Residences; 80th Street; *Thom & Wilson.*
John C. Goodridge, Jr....2 Residences; 113 and 115 East 25th Street.
George W. Da Cunha................3 Residences; West 83d Street.
G. W. De Bevoise...................Residence; 24 West 124th Street.
James M. Cumings.....Residence; 151st Street and St. Nicholas Place.
George Taylor..........................Residence; *W. B. Tuthill.*
John W. Aitken................Lawn Tennis Court; " "
William Pickhardt, Esq....Private Stable; East 75th Street; *Mr. E. S. Philbrick, Consulting Engineer.*
Miss Ann L. Livingston............Residence; *A. L. Webster, C. E.*

New York State.

Richard Prescott, C. E....................Residence; Adamsville.
Horace Andrews, C. E.................. " Albany.
Farmers National Bank..............................Amsterdam.
Central Hotel.................................... "
Henry W. Case.............................Residence; "

Note: Name of architect in italics.

Wm. Barnes	Residence ;	Amsterdam.
Wm. Carpenter	"	"
James A. Miller (5)	"	"
Chas. D. Austin	"	"
Willis Wendell	"	"
J. R. Dowsland	"	"
John Wheelock	"	"
Justus Banta	"	"
Kirschner Estate	"	"
Patrick Cassidy	"	"
Dr. Frazier	"	"
Daniel Radley	"	"
John Charles Miller	"	"

(O'Brian & McGrath, Licensed Agents for Amsterdam.)

J. Ralph Burnett	Residence ;	Astoria.
S. W. Thomas	"	Bay Ridge.
James Otis Hoyt	*Babb, Cook & Willard;*	Bellport.
Albert Steiner	Apartment House ;	Brooklyn.
William Macbeth	Residence ; *A. Howe, Jr ;*	"
Adelphi Academy	*C. C. Haight ;*	"
Fred. J. Miller	Residence ;	"
J. J. Albright	*E. B. Guthrie, C. E. ;*	Buffalo.
Mrs. M. A. Ransom	"	"
E. N. Cook	"	"
Dr. Roswell Park	"	"
George H. Dunbar	"	"
W. H. Gratwick	*H. H. Richardson ;*	"
N. Y. West Shore & Buffalo Ry. Co	Depot ;	Canajoharie.
" " "	"	Canastota.
" " "	"	Cornwall.
A. Beekman Cox, C. E.	Residence ;	Cherry Valley.
William Constable, Jr	"	Cooperstown.
Dr. James H. Jackson		Dansville.
N. Y. West Shore & Buffalo Ry. Co	Depot ;	Frankfort.
" " "	"	Fultonville.
W. H. Arnold	Residence ;	Great Neck.
E. B. Clark	"	Greenport.
W. H. Copeland		Hoosick Falls.
W. Bayard Cutting	*C. C. Haight;*	Islip.
N. Y. West Shore & Buffalo Ry. Co	Depot ;	Mohawk.
Wm. A. Miles	*Wm. B. Tubby ;*	Mt. Vernon.
E. A. Newell	*H. S. Rapelye ;*	"
Mrs. Mary W. Howe (2)	"	"
J. H. Belding	"	"
Jules Dardonville	"	"
Dr. Robert H. Howe		"
Mrs. E. M. Howard	*W. B. Tuthill ;*	New Brighton.
Rev. C. F. Canedy	*F. Carles Merry ;*	New Rochelle.
Prof. H. T. Vulte	4 houses ;	"
Joseph F. Waller		North Yonkers.
N. Y. West Shore & Buffalo Ry. Co	Depot ;	Port Jackson.
Dr. L. E. Felton	Residence ;	Potsdam.
Brooks & Bicknell	Block ;	"
Ives Bros	"	"
N. L. Stone		"
O. G. Howe		"
Mrs. S. A. Loveland		"

(M. E. Loveland, Licensed Agent for Potsdam.)

LIEUT. AARON WARD, U. S. N....................Residence; Roslyn.
JOHN R. LOCKWOOD.............................. " Rye.
W. B. LANDRETH, C. E........................... " Schenectady.
N. Y. WEST SHORE & BUFFALO RY. CO..............Depot; Syracuse.
ROWLAND HAZARD.......................(Peace Dale, R. I.) "
N. T. BACON.. "
E. B. COBB........................Residence; *Paul Beck;* Tarrytown.
WILLIAM SMITH BROWN.....................Residence; "
GEO. M. PULLMAN............................ " Thousand Islands.
OAKWOOD CEMETERY: Lodge.......*Fuller, Wheeler & Prescott;* Troy.
S. H. FANCHER...................................Residence; Walton.
WILLIAM REYNOLDS BROWN..................... " White Plains.
DR. ROBERT STONE..................*Palliser, Palliser & Co;* Yonkers.
C. A. PEENE...................................*H. S. Rapelye;* "

Chicago.

PULLMAN'S PALACE CAR CO.: The entire city of Pullman: 1600 buildings..................................*Mr. S. S. Beman, Architect.*
PULLMAN'S PALACE CAR CO.............Office building; *S. S. Beman.*
FIRST NATIONAL BANK........Office building; *Burling & Whitehouse.*
CHICAGO, BUR. & QUINCY R. R. CO.: Office building; *Burnham & Root.*
RIALTO BUILDING.................... " " " "
COMMERCE BUILDING.................. " " " "
TRADERS BUILDING................... " " " "
HOME INSURANCE CO. (N. Y.)........ " " *W. L. B. Jenney.*
CITY HALL..*Egan & Hill.*
NORTH CHICAGO CITY RY. CO.........Offices; *Augustus Wright, C. E.*
DEARBORN STREET UNION DEPOT..................*C. F. W. Eidlitz.*
MARSHALL FIELD & CO............................*H. H. Richardson.*
BREVOORT HOUSE................................*Thomas & Rogers.*
DR. ALMON BROOKS...................Residence (Drainage renewed).
HENRY W. KING...................... " " "
JOHN WILKINSON..................... " " "
W. K. ACKERMAN..................... " " "
O. W. POTTER....................... " " "
GEORGE L. DUNLAP................... " " "
JAMES BOLTON....................... " " "
HENRY W. BISHOP.................... " " "
BENEZETTE WILLIAMS, C. E........... " " "
JOHN R. WALSH...................... " *Burnham & Root.*
W. T. BAKER........................ " " "
HUGH R. WILSON..................... " " "
ARTHUR CATON....................... " " "
H. H. SHUFELDT..................... " " "
W. C. EGAN......................... " " "
JOSEPH SEARS....................... " " "
J. C. BLACK........................ " " "
SIDNEY A. KENT..................... " " "
W. F. COBB......................... " " "
HENRY FIELD........................ " " "
SAMUEL M. NICKERSON................ " *Burling & Whitehouse.*
J. W. DOANE........................ " *T. V. Wadskier.*
J. M. ADSIT........................ " *J. M. Van Osdel & Co.*
ROBERT T. LINCOLN.................. " *S. S. Beman.*
EDWARD F. LAWRENCE................. " " "
S. S. BEMAN........................ " " "
N. S. JONES........................ " " "
WALTER C. LARNED................... " (2); *W. L. B. Jenney.*
DR. ROBERT N. TOOKER............... " " "

William S. Potwin........Residence: *W. L. B. Jenney.*
Henry I. Cobb........" *Cobb & Frost.*
James G. Gore........" *Frank N. Charnley.*
James A. Davidson........" *W. W. Boyington.*
J. J. Glessner........" *H. H. Richardson.*

Alabama.

W. G. Williamson, C. E........Montgomery.
J. H. Holley........Residence; Selma.

Colorado.

Geo. Kissell........Residence; *W. B. Perkins;* Colorado Springs.
Wm. A. Peck........" *Varian & Sterner;* Denver.
Chas. M. Kittredge...." *Wm. Lang;* "
W. J. Kinsey........" *F. E. Edbrooke & Co.;* "
C. F. Sampson........" *A. M. Stuckert;* "
S. B. Morgan........" " "

Connecticut.

W. R. Palmer........Bridgeport.
Town House........"
Theodore Benedict........Residence; Danbury.
Dr. William J. Rider........" "
Theodore Smith........" "
Isaac W. Ives........Block; "
Henry Perry........" "
Chauncey Beers........" "
Library Association........Town Club House; "
W. C. Bryant........Residence; "
Reuben Pierce........" "
W. B. Curtis........" "
J. A. Beal........" "
John W. Green........" "

(The J. M. Ives Co., Licensed Agents for Danbury.)

Col. L. A. Barbour........Residence; *M. P. Hapgood;* Hartford.
Richard L. de Zeng........Residence; Middletown.
Thomas Corscadem........" New Britain.
Giles L. Reynolds........" "
Andrew J. Sloper........" "
Thomas W. Wilbur........" "

(S. H. Beard, Licensed Agent for New Britain.)

Robert Peck........Residence; New Haven.
Wm. Downs........*Babb, Cook & Willard;* " "
J. N. Harris........*W. H. Richards, C. E.;* Block; New London.
Old Ladies' Home....." " " "
Chas. E. Chandler, C. E........Residence; Norwich.
Charles D. Smith........" Plantsville.
Henry R. Kibbe........*E. C. Gardner, Architect;* " Somers.
Peck, Stow & Wilcox Co........Factories; Southington.
Yale Lock Manufacturing Co........Stamford.
Mrs. Thomas Crane........Residence; "

Delaware.

Tilghman Johnston........Residence; Wilmington.

Lieut. Aaron Ward, U. S. N.....................Residence ; Roslyn.
John R. Lockwood.............................. '' Rye.
W. B. Landreth, C. E........................... '' Schenectady.
N. Y. West Shore & Buffalo Ry. Co...............Depot ; Syracuse.
Rowland Hazard.......................(Peace Dale, R. I.) ''
N. T. Bacon.. ''
E. B. Cobb.........................Residence ; *Paul Beck ;* Tarrytown.
William Smith Brown........................Residence ; ''
Geo. M. Pullman.............................. '' Thousand Islands.
Oakwood Cemetery : Lodge.......*Fuller, Wheeler & Prescott ;* Troy.
S. H. Fancher.................................Residence ; Walton.
William Reynolds Brown........................ '' White Plains.
Dr. Robert Stone..................*Palliser, Palliser & Co ;* Yonkers.
C. A. Peene..................................*H. S. Rapelye ;* ''

Chicago.

Pullman's Palace Car Co. : The entire city of Pullman : 1600 buildings.....................................*Mr. S. S. Beman, Architect.*
Pullman's Palace Car Co..............Office building ; *S. S. Beman.*
First National Bank.........Office building ; *Burling & Whitehouse.*
Chicago, Bur. & Quincy R. R. Co. : Office building ; *Burnham & Root.*
Rialto Building.................... '' '' '' ''
Commerce Building.................. '' '' '' ''
Traders Building................... '' '' '' ''
Home Insurance Co. (N. Y.)......... '' '' *W. L. B. Jenney.*
City Hall...*Egan & Hill.*
North Chicago City Ry. Co.........Offices ; *Augustus Wright, C. E.*
Dearborn Street Union Depot....................*C. F. W. Eidlitz.*
Marshall Field & Co..........................*H. H. Richardson.*
Brevoort House...............................*Thomas & Rogers.*
Dr. Almon Brooks...................Residence (Drainage renewed).
Henry W. King...................... '' '' ''
John Wilkinson..................... '' '' ''
W. K. Ackerman..................... '' '' ''
O. W. Potter....................... '' '' ''
George L. Dunlap................... '' '' ''
James Bolton....................... '' '' ''
Henry W. Bishop.................... '' '' ''
Benezette Williams, C. E........... '' '' ''
John R. Walsh...................... '' *Burnham & Root.*
W. T. Baker........................ '' '' ''
Hugh R. Wilson..................... '' '' ''
Arthur Caton....................... '' '' ''
H. H. Shufeldt..................... '' '' ''
W. C. Egan......................... '' '' ''
Joseph Sears....................... '' '' ''
J. C. Black........................ '' '' ''
Sidney A. Kent..................... '' '' ''
W. F. Cobb......................... '' '' ''
Henry Field........................ '' '' ''
Samuel M. Nickerson................ '' *Burling & Whitehouse.*
J. W. Doane........................ '' *T. V. Wadskier.*
J. M. Adsit........................ '' *J. M. Van Osdel & Co.*
Robert T. Lincoln.................. '' *S. S. Beman.*
Edward F. Lawrence................. '' '' ''
S. S. Beman........................ '' '' ''
N. S. Jones........................ '' '' ''
Walter C. Larned................... '' (2) ; *W. L. B. Jenney.*
Dr. Robert N. Tooker............... '' '' ''

William S. Potwin	Residence:	*W. L. B. Jenney.*	
Henry I. Cobb	"	*Cobb & Frost.*	
James G. Gore	"	*Frank N. Charnley.*	
James A. Davidson	"	*W. W. Boyington.*	
J. J. Glessner	"	*H. H. Richardson.*	

Alabama.

W. G. Williamson, C. E			Montgomery.
J. H. Holley	Residence;		Selma.

Colorado.

Geo. Kissell	Residence;	*W. B. Perkins;*	Colorado Springs.
Wm. A. Peck	"	*Varian & Sterner;*	Denver.
Chas. M. Kittredge	"	*Wm. Lang;*	"
W. J. Kinsey	"	*F. E. Edbrooke & Co;*	"
C. F. Sampson	"	*A. M. Stuckert;*	"
S. B. Morgan	"	"	"

Connecticut.

W. R. Palmer			Bridgeport.
Town House			"
Theodore Benedict	Residence;		Danbury.
Dr. William J. Rider	"		"
Theodore Smith	"		"
Isaac W. Ives	Block;		"
Henry Perry	"		"
Chauncey Beers	"		"
Library Association	Town Club House;		"
W. C. Bryant	Residence;		"
Reuben Pierce	"		"
W. B. Curtis	"		"
J. A. Beal	"		"
John W. Green	"		"

(The J. M. Ives Co., Licensed Agents for Danbury.)

Col. L. A. Barbour	Residence;	*M. P. Hapgood;*	Hartford.
Richard L. de Zeng	Residence;		Middletown.
Thomas Corscaden	"		New Britain.
Giles L. Reynolds	"		"
Andrew J. Sloper	"		"
Thomas W. Wilbur	"		"

(S. H. Beard, Licensed Agent for New Britain.)

Robert Peck	Residence;		New Haven.
Wm. Downs		*Babb, Cook & Willard;*	" "
J. N. Harris	Block;	*W. H. Richards, C. E.;*	New London.
Old Ladies' Home	"	" "	"
Chas. E. Chandler, C. E.	Residence;		Norwich.
Charles D. Smith	"		Plantsville.
Henry R. Kibbe	"	*E. C. Gardner, Architect;*	Somers.
Peck, Stow & Wilcox Co	Factories;		Southington.
Yale Lock Manufacturing Co			Stamford.
Mrs. Thomas Crane	Residence;		"

Delaware.

Tilghman Johnston	Residence;		Wilmington.

Florida.

F. G. Sampson ... Boardman.

Georgia.

Cotton Exchange ... *Wm. G. Preston, Architect, Boston;* Savannah.
W. B. W. Howe, Jr., C. E. ... Residence; "
Brunswick & Western Ry. Co ... Offices; Brunswick.

Kansas.

Atchison, Topeka & Santa Fé R. R. Co.: Office Building and Depot; *Burnham & Root* ... Topeka.

Maine.

C. B. Thurston ... Residence; Portland.
City Hall ... Drainage renewed; "

Manitoba.

New Civic Offices ... *James Chisholm, Architect;* Winnipeg.

Massachusetts.

American Express Company ... Stable; Boston.
Children's Hospital ... "
G. W. Armstrong ... Residence; Brookline.
H. H. Logan ... " "
C. A. Campbell ... " Chelsea.
G. Clinton Gardner ... " Greenfield.
F. E. Wells ... " "
Clemens Herschel, C. E. ... " Holyoke.
C. A. King ... " Mattapoisett.
G. M. Haskell ... " New Bedford.
Pasque Island Association ... Club House; Pasque Island.

Michigan.

Charles Holmes, C. E. ... Residence; East Saginaw.
Frey & Wicklein ... Store; "
George B. Brooks ... Residence; "
Pope, Sheppard & Co ... " Houghton.

Minnesota.

Adams School ... Duluth.
Plant & Whitney ... Minneapolis.
West Hotel ... "
J. J. Watson ... St. Paul.
New York Life Ins. Co.: Office building ... "
Babb, Cook & Willard, Architects.

Missouri.

Charles W. Melcher, C. E. ... Residence; St. Louis.

Montana.

First National Bank ... Helena.
Court House ... "
Holter's Block ... "
R. R. Dunn, Esq ... Residence; "
Hon. A. J. Seligman ... " "
St. Peter's Hospital ... "

NORTHERN PACIFIC R. R. OFFICES	Helena.
T. C. POWER, ESQ.	"Steamboat Block" (Hotel, etc.); "
" "	"Gold Block" (Montana Club, etc.); "
KLEINSCHMIDT BLOCK	Stores and Offices; "
HON. W. A. CHESSMAN	Residence; "
HON. W. F. SANDERS	" "
H. F. GALEN, ESQ.	"
CHILD & EDGERTON	Orofino Terrace, 6 houses; "

(Durham House Drainage Co. of Helena, Montana, Licensed Agents.)

Nebraska.

GEORGE W. FRANK	Residence; Kearney.

New Hampshire.

SENTER HOUSE	Centre Harbor.
ISAIAH ROBBINS, JR.	Residence; Nashua.

New Jersey.

GEO. W. BYRAM	Bank building; Asbury Park.
MERCER MEMORIAL HOME	Atlantic City.
DR. GEO. PECK, U. S. N.	Residence; Elizabeth.
WILLIAM H. BOARDMAN	Residence; Franklin.
W. P. AMMERMAN	Residence; Hackensack.
JAMES A. ROMEYN	" "

(Edmund A. Pearce, Licensed Agent for Hackensack.)

MRS. A. P. TRUSLOW	*Babb, Cook & Willard*; Millburn.
GEO. INNESS, JR.	" " Montclair.
J. T. STEVENS	Residence; "
C. W. ANDERSON	" "
J. C. PUMPELLY	Residences (2); Morristown.
G. W. COLLES	" (2); "
F. E. WOODRUFF	" "
H. W. ROBERT	" "
F. C. PRINDLE, C. E., U. S. N.	Residences (3); Orange.
F. H. SCOTT	*Babb, Cook & Willard*; " "
JOHN S. COOKE	" Paterson.
FRED. W. COOKE	" "

Fuller, Wheeler & Prescott, Albany, Architects.

JOHN ROYLE & SONS	Factory; "
MUHLENBERG HOSPITAL	*Charles W. Smith, Architect*; Plainfield.
JOSEPH CUMINGS	Residence; Rutherford.
WEST SHORE TERMINAL STATION	Weehawken.

Ohio.

CASE SCHOOL OF APPLIED SCIENCE	Cleveland.
CITY INFIRMARY	"

(James Ritchie, Licensed Agent for Cleveland.)

HARLEY T. PROCTER	Residence; Cincinnati.
A. HOWARD HINKLE	" "
S. H. EVANS	" Glendale.

Ontario.

F. S. RATHBUN	Residence; *M. J. Butler, C. E.*; Deseronto.

Pennsylvania.

W. S. AUCHINCLOSS, C. E.	Bryn Mawr.
CHAUNCEY IVES, C. E.	Residence; Chambersburg.

W. Coleman Freeman	Residence;		Cornwall.
D. P. Bruner	19 houses;		Germantown.
S. J. M. McCarrell	Residence;		Harrisburg.
Henry Johnson	"		Muncy.
George Burnham, Jr.	Residence;	*Albert W. Dilks*;	Philadelphia.
Theodore J. Lewis	"	"	"
A. J. Drexel	"	*T. Roney Williamson*;	"
Bricklayers' Association		"	"
M. R. Muckle, Jr.		"	
Volney N. Shaffer	Residence (2);		Phœnixville.
J. Allen Healy	"		Pottstown.
Geo. H. Potts	"		"
R. C. Luther	"		Pottsville.
H. L. Daddow	"		St. Clair.
Lackawanna Hospital			Scranton.

Quebec.

New York Life Ins. Co:	Office building	*Babb, Cook & Willard, Architects.*	Montreal.

Rhode Island.

D. Goff & Sons	2 Cotton Mills;	Pawtucket.
A. P. Crandall	Residence;	Newport.
Rowland Hazard	"	Peace Dale.

South Carolina.

State House		*Frank Niernsée, Architect*;	Columbia.
William Enston Home;	19 Cottages;	*W. B. W. Howe, Jr., C. E.*	Charleston.
City Hospital			"
Valk & Murdock	Residence;		"

Texas.

Tremont House		Galveston.
James F. Starr	Residence;	Marshall.

Vermont.

Dr. Henry Tucker	Residence;	Brattleboro.
J. A. Lindsey	"	"
C. W. Wilcox	"	"
I. O. P. Smith	"	"
E. L. Cook	"	"
G. A. Hines	"	"
E. A. Foster	"	"
W. E. Combs	"	"
C. S. Sargent	"	"
W. F. Goddard	"	"
J. H. Holden (2)	"	"
A. G. Carlton	"	"
T. W. Bruce	"	"
J. G. Smith	"	"
E. L. Holton	"	"
Vermont Asylum		"

Wisconsin.

Dr. N. A. Pennoyer	Residence;	Kenosha.

1889

Durham
System of
House
Drainage

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